Comprehensive Transportation Review

375 and 425 M Street SW
Stage 2 PUD

Washington, DC

October 17, 2017

GOROVE / SLADE
Transportation Planners and Engineers

Prepared by:

GOROVE / SLADE

Transportation Planners and Engineers

1140 Connecticut Avenue NW
Suite 600
Washington, DC 20036
Tel: 202.296.8625
Fax: 202.785.1276

3914 Centreville Road
Suite 330
Chantilly, VA 20151
Tel: 703.787.9595
Fax: 703.787.9905

15125 Washington Street
Suite 212
Haymarket, VA 20169
Tel: 571.248.0992
Fax: 703.787.9905

www.goroveslade.com

Contents

Executive Summary i
Introduction 1
- Purpose of Study 1
- Project Summary 1
- Contents of Study 1

Study Area Overview 5
- Major Transportation Features 5
- Future Projects 6

Project Design 13
- Project Summary 13
- Site Access and Circulation 14
- Loading 15
- Parking 15
- Bicycle and Pedestrian Facilities 16
- Transportation Demand Management (TDM) 17

Trip Generation 26
Traffic Operations 30
- Study Area, Scope, & Methodology 31
- Vehicular Analysis Results 34
- Mitigations and Improvements 35

Transit 60
- Existing Transit Service 60
- Proposed Transit Service 61
- Site-generated transit Impacts 61

Pedestrian Facilities 64
- Pedestrian Study Area 64
- Pedestrian Infrastructure 64
- Site Impacts 65

Bicycle Facilities 68
- Existing Bicycle Facilities 68
- Proposed Bicycle Facilities 68
- Site Impacts 69

Crash Data Analysis 71
- Summary of Available Crash Data 71
- Potential Impacts 72

Summary and Conclusions 73

Figures

Figure 1: Site Location 3
Figure 2: Site Location (Aerial) 4
Figure 3: Major Regional Transportation Facilities 10
Figure 4: Major Local Transportation Facilities 11
Figure 5: Planned Development Map 12
Figure 6: Proposed Site Plan – East Building 19
Figure 7: Proposed Site Plan – West Building 20
Figure 8: Stage 1/Stage 2 PUD Development Comparison 21
Figure 9: Stage 1/Stage 2 PUD Vehicular Access and Circulation Comparison 22
Figure 10: Stage 1/Stage 2 PUD Loading Access and Circulation Comparison 23
Figure 11: Overall Waterfront Station Site Plan 24
Figure 12: Public Realm Plan 25
Figure 13: Study Area Intersections 39
Figure 14: Existing Peak Hour Traffic Volumes (2017) 40
Figure 15: Background Peak Hour Traffic Volumes (2019) 41
Figure 16: Inbound Trip Distribution and Routing – East Building 42
Figure 17: Outbound Trip Distribution and Routing – East Building 43
Figure 18: Inbound Trip Distribution and Routing – West Building 44
Figure 19: Outbound Trip Distribution and Routing – West Building 45
Figure 20: Existing Lane Configuration and Traffic Control (2017) 46
Figure 21: Background and Future Lane Configuration and Traffic Control (2019) 47
Figure 22: Site-Generated Peak Hour Traffic Volumes (2019) 48
Figure 23: Future Peak Hour Traffic Volumes (2019) 49
Figure 24: Rerouted Traffic Volumes at M Street and 4th Street SW 50
Figure 25: Future Peak Hour Rerouted Traffic Volumes (2019) 51
Figure 26: Morning Peak Hour Capacity Analysis Results 56
Figure 27: Afternoon Peak Hour Capacity Analysis Results 57
Figure 28: Existing Transit Service 63
Figure 29: Pedestrian Pathways 66
Figure 30: Existing Pedestrian Infrastructure 67
Figure 31: Existing and Proposed Bicycle Facilities 70

Tables

Table 1: Summary of Carshare Locations.... 6

Table 2: 2007 TIS Trip Generation Projections.... 27

Table 3: Proposed Mode Split – East Building 27

Table 4: Proposed Mode Split – West Building.... 27

Table 5: 2017 Trip Generation Summary – East Building.... 27

Table 6: 2017 Trip Generation Summary – West Building 28

Table 7: 2017 Combined Trip Generation Summary.... 28

Table 8: 2007 Trip Generation Summary (using current trip gen methodology).... 29

Table 9: Comparison of 2007 vs. 2017 Trip generation Projections (using current trip gen methodology).... 29

Table 10: Summary of Background Development Trip Generation 38

Table 11: Applied Annual and Total Growth Rates 38

Table 12: LOS Results 52

Table 13: Queueing Results (in feet).... 54

Table 14: Vehicular Capacity Analysis Results with Mitigations 58

Table 15: Queueing Results (in feet) (with Mitigations) 58

Table 16: Vehicular Capacity Analysis Results with Rerouting of Southbound Left Turns.... 59

Table 17: Metrobus and Regional Commuter Bus Route Information 60

Table 18: Sidewalk Requirements.... 64

Table 19: Intersection Crash Rates 71

Table 20: Crash Type Breakdown.... 72

EXECUTIVE SUMMARY

The following report is a Comprehensive Transportation Review (CTR) for the Stage 2 Planned Unit Development (PUD) and modification to the approved First-Stage PUD for 375 and 425 M Street SW (the "East M Street Site and the West M Street Site," respectively, or "M Street Sites," collectively). The report reviews the transportation aspects of the project's PUD application (Zoning Commission Case Number 02-38I).

The purpose of this study is to evaluate whether the proposed buildings on the East and West M Street Sites (the "East Building" and the "West Building", respectively, or the "M Street Buildings", collectively) will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, background conditions, and future conditions. This report concludes that **the M Street Sites will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigation measures are implemented.

Approved First-Stage PUD

The East M Street Site is currently undeveloped and is generally bounded by a shared vehicle/pedestrian plaza to the north, M Street SW to the south, a private drive to the east, and 4th Street SW to the west. The West M Street Site is also currently undeveloped and is generally bounded by a shared vehicle/pedestrian plaza to the north, M Street SW to the south, 4th Street SW to the east, and a private drive to the west.

The M Street Sites are a part of the larger Waterfront Station PUD approved as a Stage 1 PUD in July 2003 (Zoning Commission Order No. 02-38) that included a medium-high density project containing a mixture of office, retail, and residential uses with an overall gross floor area of 2,526,500 square feet (the "Overall PUD"). The Stage 1 PUD also included the re-opening of 4th Street through the Overall PUD Site.

A Modified Stage 1 PUD (and Stage 2 approval for the center portion of the Overall PUD Site) was previously approved by the Zoning Commission on November 17, 2007, by Zoning Commission Order No. 02-38A (the "First Stage PUD" or "ZC Order No. 02-38A"). In ZC Order No. 02-38A, the Zoning Commission approved the construction of six new buildings and the conversion of two existing buildings to residential use on the Overall PUD Site. The approved First-Stage PUD included a comprehensive circulation and site access plan that was based on the reintroduction of 4th Street, and the creation of two north-south private drives to provide primary access to parking and loading.

The First Stage PUD approved the M Street Sites to be redeveloped as office buildings with ground floor retail. The East Building was approved as a 339,815 SF commercial office building with below-grade parking spaces accessed from a new curb cut on M Street and loading facilities accessed from the north-south private drive on the east side of the East Building. The West Building was approved as a 322,785 SF commercial office building with below-grade parking spaces accessed from a second new curb cut on M Street and loading facilities accessed from the north-south private drive on the west side of the West Building.

Proposed Project for the M Street Sites

The proposed Second-Stage PUD and modification to the First Stage PUD proposes to change the primary use of the M Street Buildings from office to residential. The proposed development programs for the East and West Buildings consist of the following elements:

- **East Building:** The project is proposed to include 18,640 SF of office space, 21,930 SF of retail space, 308 residential units, and 198 below-grade parking spaces.
- **West Building:** The project is proposed to include 19,370 SF of office space, 19,940 SF of retail space, 296 residential units, and 165 below-grade parking spaces.

Vehicular access to the below-grade parking garage for the East Building will be from the north-south private drive on the east side of the building. This private drive will also facilitate trash pickup and loading operations, which will be located adjacent to the garage access. The private drive connects to the pedestrian plaza to the north and M Street SW to the south.

Vehicular access to the below-grade parking garage for the West Building will be from the north-south private drive on the west side of the building. This private drive will also facilitate trash pickup and loading operations, which will be located adjacent to the garage access. The private drive connects Makemie Place/K Street to the north and M Street SW to the south.

This access and circulation plan is a significant improvement over the access plan approved in the First Stage PUD, which included a total of four (4) curb cuts along M Street. Overall, the updated vehicular access plan, which eliminates two (2) curb cuts along M Street, results in a lessened impact along M Street for all roadway users and an improved pedestrian realm.

It should also be noted that the change in land use from office to residential will generate fewer vehicular trips. Industry standards show that when all other factors are the same, residential land uses generate fewer vehicular trips than office land uses.

The proposed parking and loading plans for the M Street Buildings meet or exceed zoning requirements and will accommodate the anticipated parking and loading demand for the proposed land uses. Additionally, the amount of parking and loading facilities is consistent with the parking and loading requirements for the Overall PUD, as approved in Z.C. Order No. 02-38A.

Most pedestrian facilities surrounding the M Street Sites meet DDOT and ADA standards and provide a quality walking environment. As a result of the background developments, pedestrian facilities throughout the neighborhood will be improved to meet DDOT and ADA standards. This includes sidewalks that meet or exceed the width requirements, crosswalks at all necessary locations, and curb ramps with detectable warnings. The inclusion of benches, planting beds, and additional streetlights will result in improvements over existing conditions.

The M Street Buildings will supply interior long-term bicycle parking and exterior short-term bicycle parking along the perimeter of the buildings that meet zoning requirements and anticipated demand.

Multi-Modal Impacts and Recommendations

Transit

The M Street Sites are served by eight (8) Metrobus routes and regional commuter buses that provide connectivity to the downtown core and other areas of the District, Maryland, and Virginia. The sites are located directly adjacent to the Waterfront Metrorail Station.

Although the M Street Buildings will be generating new transit trips, existing facilities have sufficient capacity to accommodate the new trips.

Pedestrian

The M Street Sites are surrounded by a generally well-connected pedestrian network. Most roadways within a quarter-mile radius provide sidewalks and acceptable crosswalks and curb ramps, particularly along the primary walking routes. However, there are areas near The Wharf to the west of the sites that have inadequate sidewalks or no sidewalks at all, with insufficient or no buffer due to on-going construction. However, these insufficiencies are only temporary and will be improved to meet or exceed DDOT standards following completion of construction of the Wharf. As a result of the background developments, pedestrian facilities in the vicinity of the M Street Sites will be improved to meet DDOT and ADA standards.

In addition to pedestrian facilities on each of the M Street Sites and directly surrounding the sites, the Applicant is also proposing to improve the public realm within and surrounding the Waterfront Metrorail Station Plaza, including the intersection of 4th Street with the pedestrian/vehicle plaza.

Bicycle

The M Street Sites have excellent connectivity to existing on- and off-street bicycle facilities. The sites are adjacent to bicycle lanes along 4th Street and I (Eye) Street. Signed routes are located on M Street, 3rd Street, and Water Street.

The M Street Buildings will supply interior long-term bicycle parking and exterior short-term bicycle parking along the perimeter of the buildings that meet zoning requirements and anticipated demand.

Vehicular

The M Street Sites are well-connected to Interstate 395 and several principal and minor arterials such as Independence Avenue, South Capitol Street, Maine Avenue, M Street and an existing network of collector and local roadways.

In order to determine impacts that the M Street Sites will have on the transportation network, this report projects future conditions with and without the development of the M Street Sites, and performs analyses of intersection delays and queues. These results were compared to the acceptable levels of delay set by DDOT standards as well as existing queues to determine if development of the M Street Sites will negatively impact the study area. The analysis concluded that two (2) intersections trigger the need to explore mitigations for the 2019 Total

Future Conditions scenario. Details of the vehicular capacity analysis are described below.

Of note, vehicular capacity analyses performed during the First Stage PUD approvals did not identify specific impacts or mitigations for the M Street Sites alone. Instead, mitigation measures for the overall PUD were recommended. The primary mitigation approved in the First Stage PUD was the reintroduction of 4th Street between I Street and M Street SW. This mitigation was completed during a previous phase of the overall development. Mitigation measures for each individual building or phase within the overall PUD were expected to be determined during each subsequent Second Stage PUD application. As such, this CTR identifies additional mitigation measures necessary for the M Street Sites specifically.

The following conclusions regarding vehicular trips and proposed mitigation measures are reached within this report.

Existing Conditions

- This scenario evaluates vehicular operations as they occur today in 2017 conditions.
- Two (2) intersections operate at unacceptable conditions in existing conditions:
  - *M Street & 4th Street, SW*
    During the AM peak hour, the westbound and northbound approaches operate at unacceptable levels of service. During the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
  - *M Street & 3rd Street, SW*
    During the PM peak hour, the southbound approach operates at unacceptable levels of service.

Background Conditions

- This scenario evaluates vehicular operations as they are forecasted to occur in future 2019 conditions assuming no development of the M Street Sites.
- Four (4) intersections operate at unacceptable conditions under background conditions, due to the addition of background development-related trips and inherent growth on the roadway network:
  - *I Street & 7th Street, SW*
    During the PM peak hour, the southbound approach operates at unacceptable levels of service.
  - *Maine Avenue & 7th Street, SW*
    During the PM peak hour, the southbound approach operates at unacceptable levels of service.
  - *M Street & 4th Street, SW*
    Consistent with existing conditions, during the AM peak hour, the westbound and northbound approaches operate at unacceptable levels of service. Additionally, the overall intersection degrades to unacceptable levels of service.
    Consistent with existing conditions, during the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
  - *M Street & 3rd Street, SW*
    Consistent with existing conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service.

Future Conditions

- This scenario evaluates vehicular operations as they are forecasted to occur in future 2019 conditions with the addition of new trips generated by the M Street Sites.
- Four (4) intersections operate at unacceptable conditions under future conditions, due to the addition of trips generated by the M Street Buildings:
  - *I Street & 7th Street, SW*
    Consistent with the background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. Additionally, the overall intersection degrades to unacceptable levels of service. Therefore, this intersection is impacted by the addition of site-generated trips during the PM peak hour.
  - *Maine Avenue & 7th Street, SW*
    Consistent with background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. The addition of site-generated trips is not expected to increase the southbound approach delay by more than 5 seconds over the background conditions. Therefore, this intersection is not considered to be impacted by the addition of site-generated trips according to DDOT standards.
  - *M Street & 4th Street, SW*
    Consistent with background conditions, during the AM peak hour, the westbound and northbound

approaches, as well as the overall intersection operate at unacceptable levels of service.

Consistent with existing conditions, during the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.

During the AM peak hour only, the overall intersection and westbound approach delays increase by more than 5 seconds over the background conditions. Therefore, this intersection is impacted by the addition of site-generated trips during the AM peak hour. Delay experienced during the PM peak hour does not increase by more than 5 seconds over the background conditions.

  - *M Street & 3rd Street, SW*

    Consistent with background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. The addition of site-generated trips is not expected to increase the southbound approach delay by more than 5 seconds over the background conditions. Therefore, this intersection is not considered to be impacted by the addition of site-generated trips.

- As stated above, development of the M Street Sites will impact two (2) study intersections by increasing traffic at specific peak-hour time periods. The intersection at M and 4th Streets SW will be impacted in the morning peak hour, and the intersection at I and 7th Streets SW will be impacted in the afternoon peak hour.
- The intersection of M Street & 4th Street operates at unacceptable levels of service in existing conditions during both the AM and PM peak hours and is exacerbated by the addition of trips generated by future background developments and the M Street Sites. Only during the AM peak hour does the delay increase such that mitigation measures are required. The proposed mitigation measure for the M Street & 4th Street intersection is to shift green time to the east-west approaches. Adjusting signal timing in this manner will decrease delay to levels that are improved over background conditions, and therefore sufficiently mitigates the additional trips generated by development of the M Street Sites.
- The intersection of 7th and I Street operates at acceptable conditions under existing conditions. Under background conditions the intersection operates at unacceptable levels of service during and is further exacerbated by the addition of trips generated by the M Street Sites. The proposed mitigation measure at 7th Street & I Street is to extend the signal cycle length from 75 seconds to 120 seconds, which is consistent with the adjacent intersections along 7th Street. This mitigation results in acceptable levels of service under future conditions, and it is recommended that DDOT implement changes to the signal cycle as part of implementing the signal and intersection improvements at this location associated with the 680 I Street SW PUD.

Transportation Demand Management (TDM)

A TDM plan was approved under the First Stage PUD application and the Applicant proposed the following TDM measures for the project:

- Designate a member(s) of the property management team as Property Transportation Coordinator who will be the primary point of contact and will be responsible for coordinating and completing TDM obligations on behalf of the Applicant. The applicant will provide the name of the Property Transportation Coordinator to the District Department of Transportation.
- Provide effective directional signage subject to the Applicant's Comprehensive Sign Plan (parking, deliveries, taxi stand, etc.) to direct residents and visitors to appropriate locations on the property.
- Provide Zip Cars/Flex Cars on site.
- Provide SmartTrip cards, during first time lease-up only, at a maximum cost to the developer of $10.00 per card, per person for free to residents and full-time office employees.
- Encourage new residents and office employees to use Metrorail, Metrobus or DC Circulator services through the following means:
  - Distribute in new-tenant and new-resident packages, materials provided by DDOT including site-specific transit-related information to all persons or entities signing leases;
  - Place a reference to the Waterfront Metro Station in promotional materials and advertisements; and
  - Participate in Ozone Action Days and other regionally sponsored clean air and traffic mitigation promotions by posting notice of such promotions in locations within the building acceptable to the developer.

Since the First Stage PUD TDM measures were approved, TDM best practices have evolved in the District and DDOT has different expectations. Therefore, the Applicant is proposing to update the TDM plan to reflect current DDOT and industry standards. As a part of the modified PUD for the M Street Buildings, the Applicant will provide the following additional/updated TDM measures:

- The Applicant will identify a TDM Leader (for planning, construction, and operations). The TDM Leader will work with residents and tenants of the M Street Buildings to distribute and market various transportation alternatives and options. This includes providing TDM materials to new residents and tenants in a Welcome Package.
- The Applicant will provide enhanced pedestrian treatments and increase pedestrian safety through pavement treatments, crosswalk changes, and signage at 4th Street in the vicinity of the Metro station and the east-west private driveways.
- The Applicant will provide SmarTrip cards, during first time lease-up only, at a maximum cost to the developer of $20.00 per card, per person for free to residents and full-time office employees.
- The Applicant will post all TDM commitments online, publicize availability, and allow the public to see what commitments have been promised.
- The Applicant will provide website links to CommuterConnections.com and goDCgo.com on property websites.
- The Applicant will install a Transportation Information Center Display (electronic screen) within the residential lobby of the M Street Buildings, containing information related to local transportation alternatives.
- The Applicant will meet the 2016 Zoning Regulations' requirements for short and long-term bicycle parking. This includes secure interior bicycle parking and short-term exterior bicycle parking around the perimeter of the M Street Sites.
- The Applicant will unbundle all parking from the cost of the lease or purchase of residential units. Parking costs will be set at no less than the charges of the lowest fee garage located within a ¼ mile.

Summary and Recommendations

Overall, the M Street Sites provide many positive transportation features, including:

- The M Street Sites are adjacent to the Waterfront Metrorail Station and within close proximity to Metrobus stops of routes along major corridors.
- The proposed parking plan meets zoning requirements and anticipated demand for the proposed land uses. Additionally, the amount of parking is consistent with the approved parking requirements for the Overall PUD.
- The M Street Sites have access to several on- and off-street bicycle facilities including bicycle lanes on 4th Street and I (Eye) Street.
- The inclusion of secure long-term bicycle parking spaces within the M Street Sites will meet zoning requirements.
- The installation of short-term bicycle parking spaces around the perimeter of the M Street Sites will meet zoning requirements.
- Improvements to the adjacent pedestrian plaza along 4th Street at the entrance to the Waterfront Metrorail Station will enhance pedestrian safety.
- The Applicant will reduce the number of curb-cuts along M Street and eliminate a median break on M Street, which will be a significant improvement over the access plan approved in the First Stage PUD.
- The total number of vehicular trips will be reduced as a result of the change in the development program.
- The Applicant proposes signal timing adjustment mitigation measures at two (2) intersections: 7th & I Street, SW and 4th & M Street, SW. These adjustments will decrease delay over background conditions.
- The Applicant will incorporate a robust Transportation Demand Management (TDM) plan to reduce the demand of single-occupancy vehicles, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.

Based on these features and the technical analysis contained within, this report concludes that **the M Street Sites will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigation measures are implemented.

INTRODUCTION

This report is a Comprehensive Transportation Review (CTR) of the Stage 2 Planned Unit Development (PUD) and modification to the approved First Stage PUD for the East and West M Street Sites. The report reviews the transportation aspects of the project's Planned Unit Development (PUD) application (Zoning Commission Case Number 02-38I).

As shown in Figure 1 and Figure 2, the M Street Sites are located in the Southwest Waterfront neighborhood in Southwest DC. This CTR is submitted into the Zoning Commission record for this case, as an evaluation of the transportation impacts of the application.

PURPOSE OF STUDY

The purpose of this report is to:

1. Review the transportation elements of the development site plans and demonstrate that the M Street Sites conform to DDOT's general policies of promoting non-automobile modes of travel and sustainability.
2. Provide information to DDOT and other agencies on how development of the M Street Sites will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the sites on all major modes of travel and where these trips will be distributed on the network.
3. Determine if development of the M Street Sites will lead to adverse impacts on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the M Street Sites and performing analyses of vehicular delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the sites will negatively impact the study area. The report discusses what improvements to the transportation network are needed to mitigate adverse impacts.

PROJECT SUMMARY

The M Street Sites are a part of the larger Waterfront Station PUD approved as a Stage 1 PUD in July 2003 (Zoning Commission Order No. 02-38). The development program proposed in the Overall PUD included 339,815 SF of office space for the East Building and 322,785 SF of office space for the West Building.

The Second-Stage PUD and modification to the First-Stage PUD proposes to change the primary use of the M Street Buildings from office to residential. The proposed plans for the East Building include 18,640 SF of office space, 21,930 SF of retail space, 308 residential units, and 198 below-grade parking spaces. The proposed plans for the West Building include 19,450 SF of office space, 19,940 SF of retail space, 296 residential units, and 165 below-grade parking spaces.

CONTENTS OF STUDY

This report contains nine sections as follows:

- *Study Area Overview*
  This section reviews the area near and adjacent to the proposed M Street Sites and includes an overview of the surrounding location.
- *Project Design*
  This section reviews the transportation components of the M Street Sites, including the site plans and access. This chapter also contains the proposed Transportation Demand Management (TDM) plan for the sites.
- *Trip Generation*
  This section outlines the travel demand of the proposed M Street Sites. It summarizes the proposed trip generation for both sites.
- *Traffic Operations*
  This section 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 M Street Sites, including presenting mitigation measures for minimizing impacts as needed.
- *Transit*
  This section summarizes the existing and future transit service surrounding the M Street Sites, reviews how the sites' transit demand will be accommodated, outlines impacts, and presents recommendations as needed.
- *Pedestrian Facilities*
  This section summarizes existing and future pedestrian access to the M Street Sites, reviews walking routes to and

from the project sites, outlines impacts, and presents recommendations as needed.

- *Bicycle Facilities*
  This section summarizes existing and future bicycle access to the M Street Sites, reviews the quality of cycling routes to and from the project sites, outlines impacts, and presents recommendations as needed.

- *Safety/Crash Analysis*
  This section reviews the potential safety impacts of the M Street Sites. This includes a review of crash data at intersections in the study area and a qualitative discussion on how development of the M Street Sites will influence safety.

- *Summary and Conclusions*
  This section presents a summary of the recommended mitigation measures by mode and presents overall report findings and conclusions.

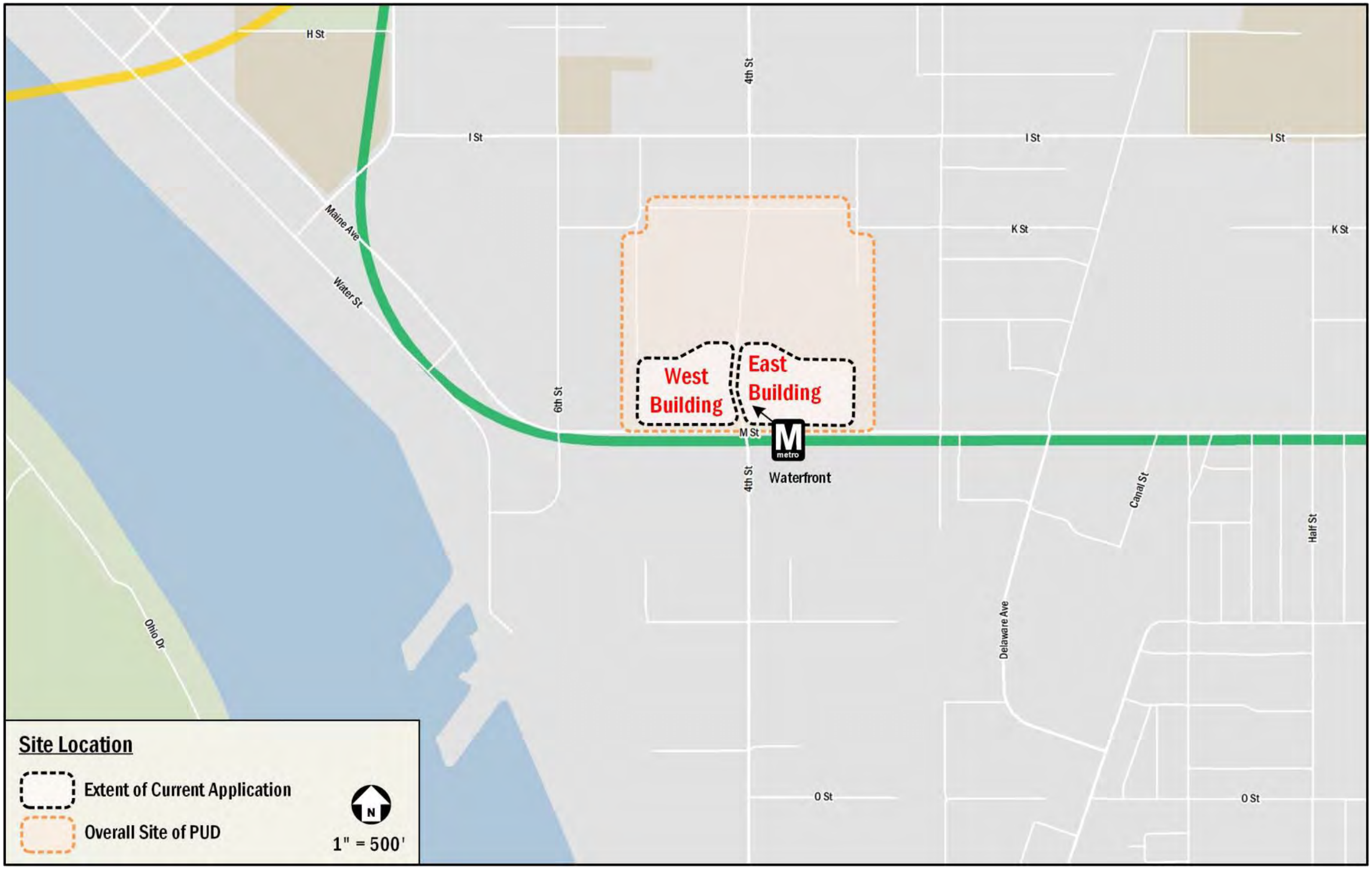

Figure 1: Site Location

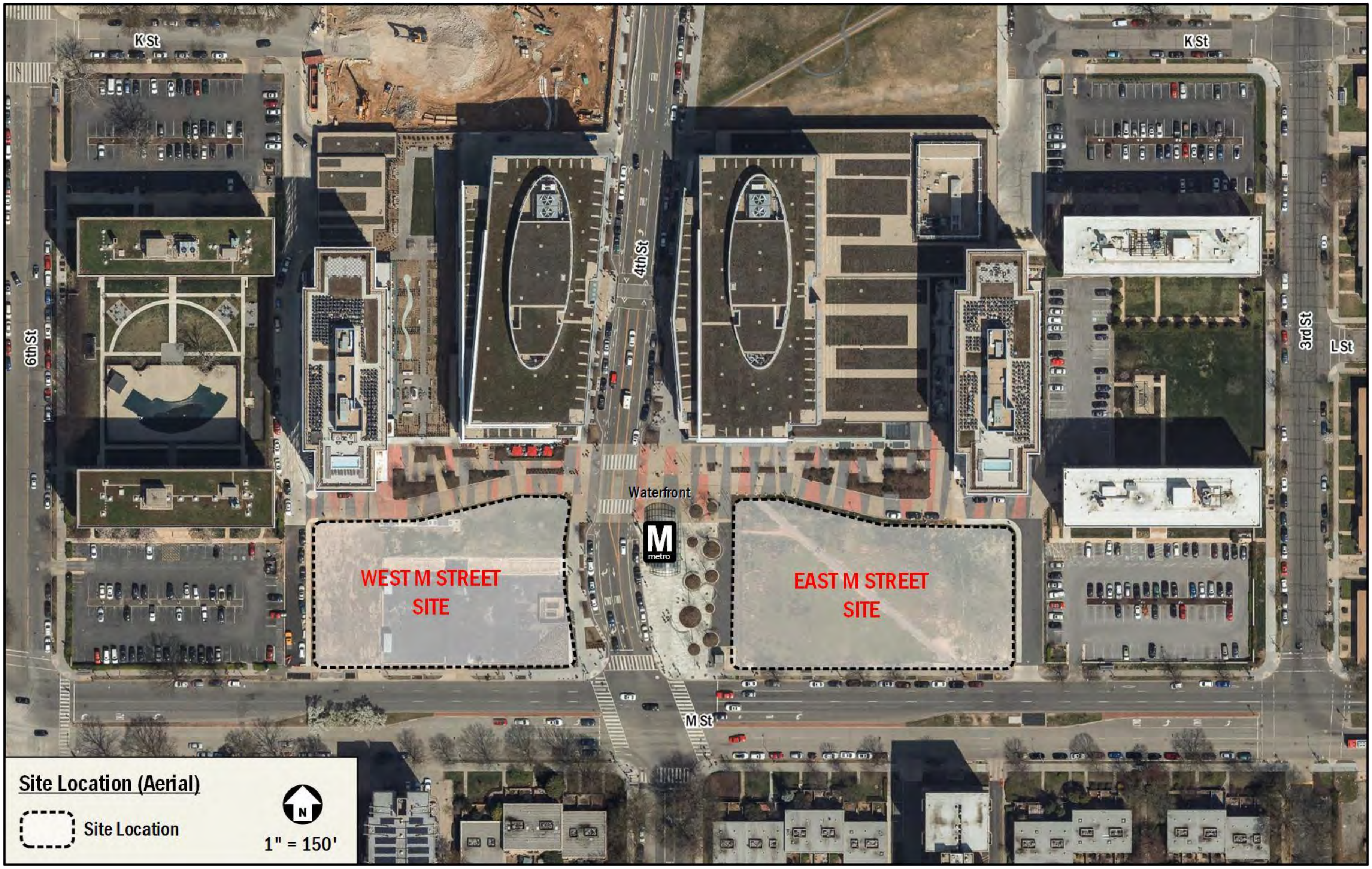

Figure 2: Site Location (Aerial)

Study Area Overview

This section reviews the study area and includes an overview of the M Street Sites, including a summary of the major transportation characteristics of the area and of future regional projects.

The following conclusions are reached within this chapter:

- The M Street Sites are surrounded by an extensive regional and local transportation system that will connect the sites to the rest of the District and surrounding areas.
- The M Street Sites are primarily served by Metrorail and Metrobus along prominent corridors such as M Street and 4th Street.
- There is bicycle infrastructure in the vicinity of the M Street Sites, with connectivity to bike lanes on 4th Street and I (Eye) Street.
- Pedestrian conditions are generally good, particularly along anticipated major walking routes.

Major Transportation Features

Overview of Regional Access

The M Street Sites have ample access to regional vehicular- and transit-based transportation options, as shown in Figure 3, that connect the sites to destinations within the District, Virginia, and Maryland.

The M Street Sites are accessible from Interstate 395 and several principal arterials such as South Capitol Street and Independence Avenue. These roadways create connectivity to the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs, as well as providing connectivity to the District core.

The sites are located directly adjacent to the Waterfront Metrorail station, which is served by the Green Line and connects northern and southern Prince George's County, Maryland, while providing access to the District core. In addition, the Green Line provides connections to all additional Metrorail lines allowing for access to much of the DC Metropolitan area.

Overall, the M Street Sites have access to several regional roadways and transit options, making it convenient to travel between the sites and destinations in the District, Virginia, and Maryland.

Overview of Local Access

There are a variety of local transportation options near the sites that serve vehicular, transit, walking, and cycling trips, as shown on Figure 4. The M Street Sites are served by a local vehicular network that includes several minor arterials such as Maine Avenue, I (Eye) Street, M Street, P Street, 4th Street, and 7th Street. In addition, there is an existing network of connector and local roadways, such as Half Street, 3rd Street, and 6th Street, which provide access to the sites.

The Metrobus system provides local transit service in the vicinity of the sites, including connections to several neighborhoods within the District and additional Metrorail stations. As shown in Figure 4 there are eight (8) Metrobus and regional commuter bus routes that service the sites. In the vicinity of the sites, there are bus stops along I (Eye) Street, M Street, 3rd Street, 4th Street, and 6th Street. These bus routes connect the sites to many areas of the District. A detailed review of transit stops within a quarter-mile walk of the sites are provided in a later section of this report.

There are several existing bike facilities near the sites that connect to areas within the District. The sites have direct connectivity to the bicycle lanes on 4th Street and I (Eye) Street, and to the signed routes on M Street, 3rd Street, and Water Street. A detailed review of existing and proposed bicycle facilities and connectivity is provided in a later section of the report.

Anticipated pedestrian routes, such as those to public transportation stops, retail zones, and community amenities, provide excellent pedestrian facilities. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later section of this report.

Overall, the M Street Sites are surrounded by an excellent local transportation network that allows for efficient transportation options via transit, bicycle, walking, or vehicular modes.

Carsharing

Three carsharing companies provide service in the District: Zipcar, Maven, and Car2Go. All three services are private companies that provide registered users access to a variety of automobiles. Of these, Zipcar and Maven have designated spaces for their vehicles. There are three (3) car-share locations with a total of nine (9) vehicles within a quarter-mile of the sites, as shown in Table 1.

Carsharing is also provided by Car2Go, which provides point-to-point car-sharing. Car2Go currently has a fleet of vehicles located throughout the District and Arlington. Car2Go 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. Car2Go 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.

Future Projects

There are a few District initiatives located in the vicinity of the M Street Sites. These planned and proposed projects are summarized below.

Local Initiatives

MoveDC: Multimodal Long-Range Transportation Plan

MoveDC is a long-range plan that provides a vision for the future of DC's transportation system. As the District grows, so must the transportation system, specifically in a way that expands transportation choices while improving the reliability of all transportation modes.

The MoveDC report outlines recommendations by mode with the goal of having them completed 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
- Water taxis

In direct relation to the proposed development, the MoveDC plan outlines recommended pedestrian and bicycle improvements such as new sidewalks, and new bicycle trails and bicycle lanes. These recommendations would create additional multi-modal capacity and connectivity to the proposed development and are discussed later in the report.

Development of the M Street Sites does not preclude any of the recommendations outlined in the MoveDC plan.

SustainableDC: Sustainable DC Plan

SustainableDC is a planning effort initiated by the Department of Energy & Environment and the Office of Planning that provides the District with a framework of leading Washington DC to become the most sustainable city in the nation. The 2012 report proposes a 20-year timeframe to answer challenges in areas of: (1) Jobs & the economy; (2) Health & Wellness; (3) Equity & Diversity; (4) Climate & Environment; (5) Built Environment; (5) Energy; (6) Food; (7) Nature; (8) Transportation; (9) Waste; and (10) Water. With respect to transportation, the sustainability goals targeted in 20 years include:

- Improving connectivity and accessibility through efficient, integrated, and affordable transit systems
- Expanding provision of safe, secure infrastructure for cyclists and pedestrians
- Reducing traffic congestion to improve mobility
- Improving air quality along major transportation routes

A combination of increasing public transit and decreasing vehicular mode shares has been suggested to meet the transportation targets.

Table 1: Summary of Carshare Locations

Carshare Location	Number of Vehicles
Zipcar	
I Street & Makemie Place SW	2 vehicles
4th Street & I Street SW	2 vehicles
3rd Street & K Street SW	5 vehicles
Total	**9 vehicles**

Development of the M Street Sites is consistent with the goals of the SustainableDC plan by improving the pedestrian plaza surrounding the Waterfront Metrorail Station and by providing ample bicycle parking.

M Street SE/SW Transportation Study

The purpose of the M Street SE/SW Transportation Study is to prepare for the substantial new growth along the M Street/Maine Avenue corridor in the near Southeast and Southwest Waterfront area. The study area is projected to see in excess of 36 million square feet of development concentrated within a 0.78 square mile core area. The premise of the study is to better integrate the area of development with the surrounding neighborhoods and to improve multimodal travel and the public realm within the neighborhood. The study area encompasses an area of approximately 1.7 square miles along the M Street SE/SW corridor and the Southwest Waterfront from 12th Street SE to 14th Street SW. The study considers existing and future transportation conditions, reviews the planned future land uses in the study area, and develops solutions for the transportation network in order to promote livable communities and to encourage reinvestment within the study area. The study recommends improvements for three conditions: near term (2013-2016), mid-term (2015-2021), and long-term (2020 and beyond).

The Draft report recommends several potential near-term projects and policy updates. The policy updates include suggestions to improve travel demand management (TDM) strategies, parking systems and regulations, transit policies, motor coach and commuter bus staging/parking, freight loading and truck routes, bicycle and pedestrian policies, and sustainable design. Potential low-cost operational and system management projects include signing and pavement marking improvements, signal timing optimization along M Street, pedestrian and Anacostia Riverwalk Trail connectivity improvements, bicycle network improvements, transit service improvements, parking changes, and sustainability and low-impact development improvements.

For the mid-term, three multimodal projects are proposed and investigated: Alternative 1 – M Street “Main Street”, Alternative 2 – “Balanced Links” and Alternative 3 – M Street “Mobility Arterial”. Alternative 1 includes prioritizing non-automobile transportation and establishing M Street as a core premium transit corridor, which would reduce M Street to two vehicular lanes in each direction with an exclusive outer transit lane. Alternative 2 balances the transit network to provide wider coverage to the entire study area by allocating new transit services to parallel corridors while creating new bicycle facilities along the M Street corridor. Alternative 3 focuses on preserving M Street as a primarily vehicular corridor with less emphasis on alternative modes by implementing operational improvements to maximize vehicular throughput, maintaining three vehicular travel lanes in each direction, and providing a shared outer lane for streetcar and transit. The three alternatives from the Draft report will be used to develop and analyze potential “hybrid” alternatives to be implemented in the mid-term.

The long-term improvements focus on potential new connections to complete the street grid in the study area if future development (beyond 2035) were to occur in areas not currently available. The long-term options include roadway improvements in the Buzzard Point area, as well as improvements to east-west connectivity; Metrorail station capacity improvements, along with Yellow line improvements; commuter rail enhancements; and multimodal transfer centers. These options would all require further study and significant agency coordination and public involvement. The study projects that the options could possibly be implemented between 2020 and 2040.

Development of the M Street Sites does not preclude any of the recommendations outlined in the M Street SE/SW Transportation Study.

Special Events Addendum to M Street SE/SW Transportation Study

This traffic safety study was initiated by DDOT in 2013 to assess the impact of multiple entertainment venues upon the transportation network in the Buzzard Point/Waterfront area. These new developments include a 20,000 seat Soccer Stadium on Buzzard Point, a 2,000+ seat movie theater east of Nationals Park, and a 6,000-seat concert hall at The Wharf. This Study was initiated as follow-on to the M Street Southeast/Southwest Transportation Planning Study. The purpose of the Special Events Transportation Analysis is to consider current and future transportation conditions associated with special events and stadium traffic in the Study area, to review plans for the proposed new event facilities and estimate corresponding future traffic demands, (vehicular, pedestrian, bicycle, transit); to determine potential impacts to the transportation system; and to develop strategies and solutions for improving conditions on the transportation network, including modifications to existing traffic management plans, to mitigate the impacts of event traffic within the Study area.

Several strategies were proposed within the Study area to ease the movement of people during event occurrences. Many of the suggested improvements have already been proposed as part of the M Street Study. These improvements include additional north-south transit connectivity, additional east-west vehicular connectivity, signing and pavement marking improvements, transportation systems management, parking systems improvements, and pedestrian and bicycle improvements.

The development of the M Street Sites does not preclude any of the recommendations outlined in the Special Events Addendum to the M Street SE/SW Transportation Study.

Southwest Neighborhood Plan

Launched in 2013 and approved in 2015, the Southwest Neighborhood Plan is an effort to guide the direction of future growth of the neighborhood over the next five to ten years. The scope of the plan extends from South Capitol Street, west to Maine Avenue SW, south to P Street SW, and north to the I-395. The main purpose of the plan is to enhance parks, pedestrian and street connections, bolster retail, integrate community amenities, and enhance transportation choices in the Southwest Waterfront neighborhood. The Plan aims to provide residents and property owners with assurances of what future development may look like, including recommendations to preserve and enhance existing assets and ensure that the neighborhood retains social and economic diversity.

The M Street Sites will support the Southwest Neighborhood Plan by including enhancements to the vehicle/pedestrian plaza along 4th Street at the entrance to the Waterfront Metrorail Station, inclusive public space, community-serving office uses, and street-activating retail use along 4th Street and M Street.

Background Developments

There are several potential development projects in the vicinity of the M Street Sites. 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 proposed development.

Based on these criteria, nine (9) background developments were ultimately included and described below. These developments were vetted and approved by DDOT as part of the scoping process for the study. Figure 5 shows the locations of these developments in relation to the M Street Sites.

The View at Waterfront

The View at Waterfront will consist of approximately 260 new residential dwelling units and 5,220 SF of retail. This development lies within the study area on the northeast corner of 6th and M Streets SW and is expected to be completed prior to the completion of the M Street SItes, therefore, it will be included in the analysis.

Eliot on 4th

(Northwest Building in Zoning Commission Order No. 02-38A)

Eliot on 4th located at 1001 4th Street SW, consists of a residential building with 365 dwelling units and approximately 5,000 square feet of retail space. This development lies within the study area and is within the PUD site. It was recently completed but was not fully leased up at the time of data collection. Therefore, it will be included in the analysis.

1000 4th Street SW – Town Center East

(Northeast Building in Zoning Commission Order No. 02-38A)

1000 4th Street SW – Town Center East will consist of approximately 443 residential dwelling units, 22,500 SF of retail, and a 10,000 SF theater. This development lies within the study area and within the PUD site. It is expected to be completed prior to the completion of the M Street Sites, therefore, it will be included in the analysis.

Town Center East

Town Center East will consist of approximately 209 new residential dwelling units and is located at 1101 3rd Street SW. This development lies within the study area and is expected to be completed prior to the completion of the M Street Sites, therefore, it will be included in the analysis.

301 M Waterfront

301 M Waterfront will consist of approximately 192 residential dwelling units, and 2,029 SF of retail and is located at 301 M Street SW, on the northwest corner of 3rd and M Streets SW. This development lies within the study area and is expected to be completed prior to the completion of the M Street Sites, therefore, it will be included in the analysis.

St. Matthews Evangelical Lutheran Church Redevelopment

St. Matthews Evangelical Lutheran Church Redevelopment, located at 222 M Street SW, will consist of approximately 217 residential dwelling units and a replacement sanctuary. This development is expected to be completed prior to the completion of the M Street sites. This development is outside of the study area but it will be included in the analysis to be conservative.

680 I (Eye) Street

680 I (Eye) Street SW will consist of approximately 173 residential dwelling units, a 11,455 SF church, and a 7,900 SF daycare. This development lies within the study area and is expected to be completed prior to the completion of the M Street Sites, therefore, it will be included in the analysis.

The Wharf (Phase 1)

Phase 1 of the Wharf (which had its grand opening on October 12, 2017) is generally located on the west side of Maine Avenue SW, north of 7th Street SW. It is a large mixed-use development with approximately 140,943 square feet of retail, 940 residential dwelling units, 218,210 square feet of office space, 278 hotel rooms, a 15,500 square-foot church, and a 134,886 square-foot event venue. The development lies within the study area and is located adjacent to the Wharf Phase 2 development. This development is currently open but was not completed prior to the collection of traffic counts, therefore, it will be included in the analysis.

The Wharf (Phase 2)

The Wharf (Phase 2) is a large mixed-use development with approximately 119,059 square feet of retail, 317 residential dwelling units, 547,504 square feet of office space, 116 hotel rooms, and 250 marina boat slips. This development lies within the study area. It is not expected to be completed prior to the completion of the M Street Sites, however, it will be included in the analysis to be conservative.

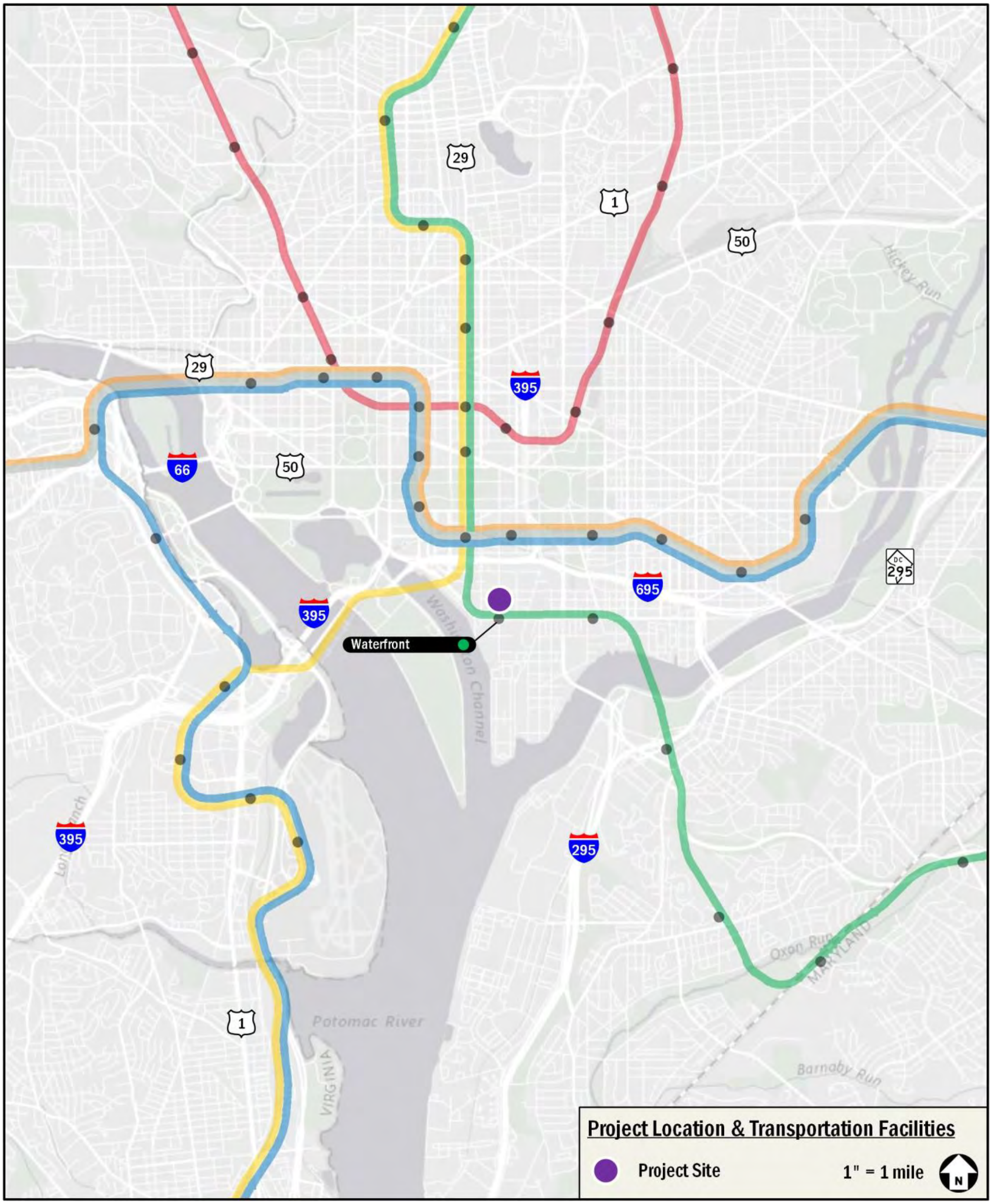

Figure 3: Major Regional Transportation Facilities

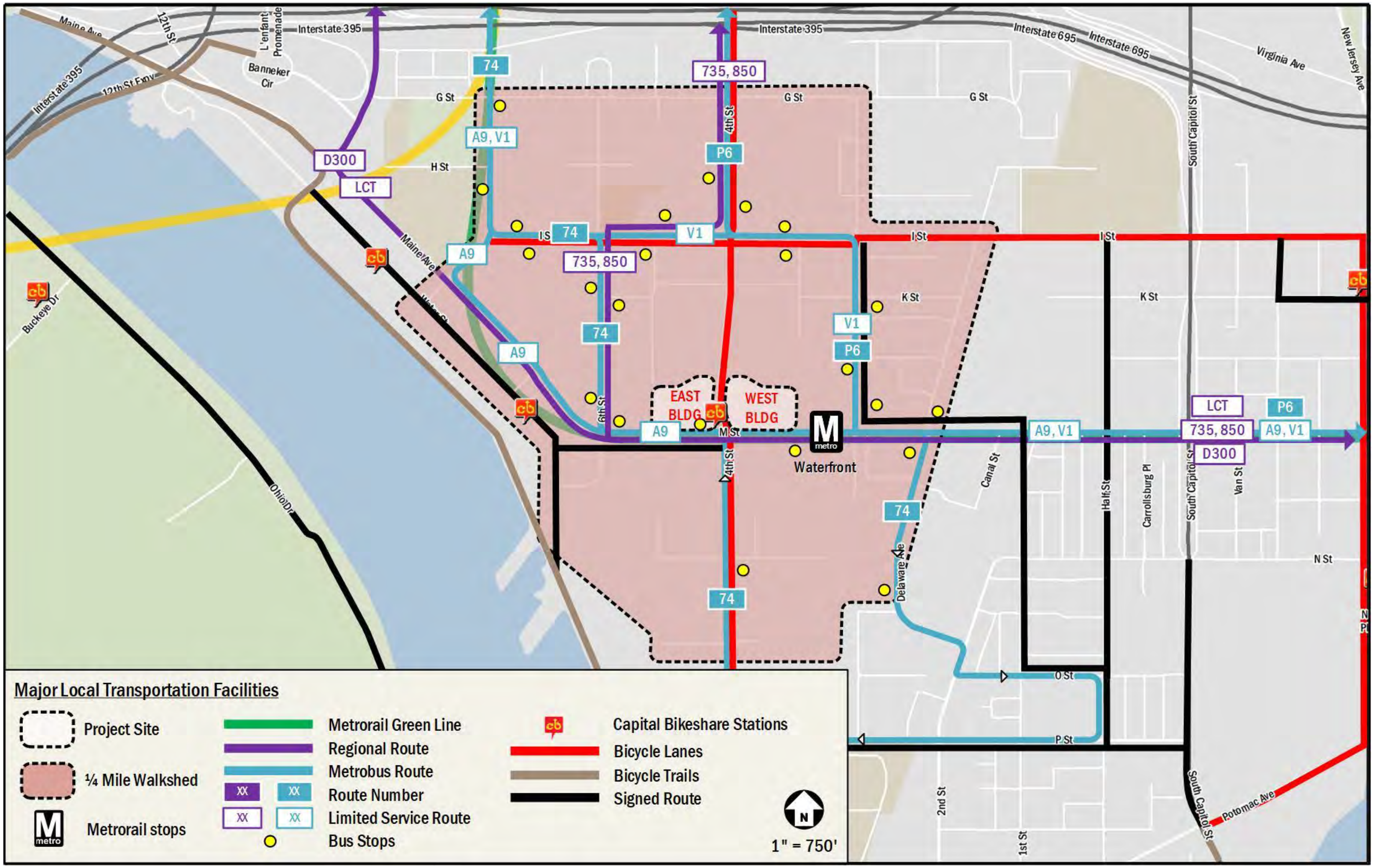

Figure 4: Major Local Transportation Facilities

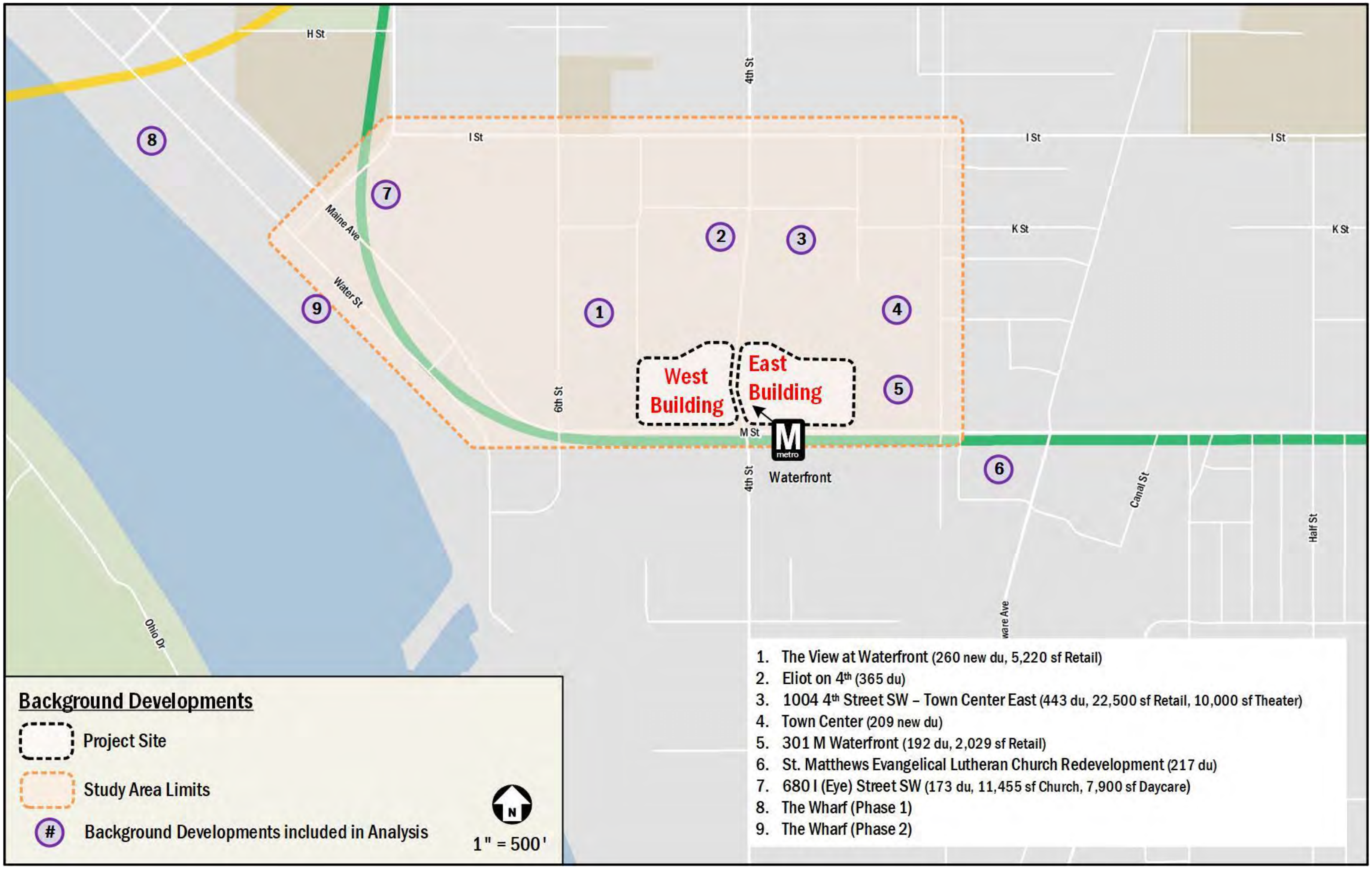

Figure 5: Planned Development Map

Project Design

This section reviews the transportation components of the M Street Sites, including the proposed site plan and access points. It includes descriptions of the vehicular access for the sites, loading, parking, bicycle and pedestrian facilities, and Transportation Demand Management (TDM) plan.

Project Summary

The East M Street Site is currently undeveloped and is generally bounded by a shared vehicle/pedestrian plaza to the north, M Street SW to the south, a private drive to the east, and 4th Street SW to the west. The West M Street Site is also currently undeveloped and is generally bounded by a shared vehicle/pedestrian plaza to the north, M Street SW to the south, 4th Street SW to the east, and a private drive to the west.

Approved First-Stage PUD

The M Street Sites are a part of the larger Waterfront Station PUD approved as a Stage 1 PUD in July 2003 (Zoning Commission Order No. 02-38) and included a medium-high density project containing a mixture of office, retail, and residential uses with an overall gross floor area of 2,526,500 square feet. The Stage 1 PUD also included the re-opening of 4th Street through the Overall PUD Site to provide improved connectivity for pedestrians and vehicular traffic, provide the opportunity for retail uses to be located along the 4th Street frontage, create curbside parking opportunities to serve the retail establishments conveniently, and open up the center of the Overall PUD Site to more light and air and improved architectural design. The re-opening of 4th Street occurred in a previous phase of the Overall PUD.

The Overall PUD also included a new public plaza surrounding the Waterfront Metrorail station and an east-west shared vehicular/pedestrian plaza connecting to private north-south drives on the east and west edges of the M Street Sites. These improvements have also been completed as part of previous phases of the Overall PUD.

A Modified Stage 1 PUD, referred to as the First Stage PUD, and Stage 2 approval for the center portion of the Overall PUD Site was previously approved by the Zoning Commission on November 17, 2007 by Zoning Commission Order No. 02-38A. In ZC Order No. 02-38A, the Zoning Commission approved the construction of six new buildings and the conversion of two existing buildings to residential use. The approved First-Stage PUD included a comprehensive circulation and site access plan that was based on the reintroduction of 4th Street, and the creation of two north-south private drives to provide primary access to parking and loading.

The First Stage PUD approved the M Street Sites to be redeveloped as office buildings with ground floor retail. The East Building was approved as a 339,815 SF commercial office building with below-grade parking spaces accessed from a new curb cut on M Street and loading facilities accessed from the north-south private drive on the east side of the East Building. The West Building was approved as a 322,785 SF commercial office building with below-grade parking spaces accessed from a second new curb cut on M Street and loading facilities accessed from the north-south private drive on the west side of the West Building.

Proposed Project for the M Street Sites

An objective of the Southwest Neighborhood Plan is to create a town center environment that emphasizes community-serving retail that can support office users during the day and residents into the evening. A market analysis of the study area indicated that office is not a viable use of the M Street Sites in the near-term. Therefore, the Second-Stage PUD and modification to the First-Stage PUD proposes to change the primary use of the buildings from office to a mixed-use building consisting of office, retail, and residential uses. These proposed uses will address the community's goal of creating a vibrant town center without the requirement that the buildings be dedicated entirely to office use. The proposed development program for the East and West Buildings consist of the following elements:

- **East Building:** The project is proposed to include 18,640 SF of office space, 21,930 SF of retail space, 308 residential units, and 198 below-grade parking spaces.
- **West Building:** The project is proposed to include 19,450 SF of office space, 19,940 SF of retail space, 296 residential units, and 165 below-grade parking spaces.

The Second Stage PUD and Modification to the First Stage PUD application also proposes changes to the M Street Building's vehicular access points by eliminating curb cuts into the parking garages from M Street. As part of the Applicant's work with DDOT and the community, the Applicant also proposes to enhance vehicular and loading circulation and improve the shared vehicular/pedestrian plaza at its crossing at 4th Street.

Figure 6 shows the proposed site plan for the East Building and Figure 7 shows the proposed site plan for West Building.

Figure 8 shows a comparison of the approved First-Stage PUD and proposed Second-Stage PUD development programs.

Figure 11 shows the overall site plan of the Overall PUD.

Site Access and Circulation

Vehicular Access

As a part of ZC Case 02-38A, vehicular access to the below-grade parking garage for the East Building was proposed to be accessed from a curb-cut on M Street SW. A private drive on the east side of the building was proposed as a connection for vehicles from the vehicle/pedestrian plaza to M Street and to facilitate trash pickup and loading operations. A median break was proposed on M Street at the private drive on the east side of the East Building.

The Second-Stage PUD and Modification to the approved First-Stage PUD application proposes vehicular access to the 198 space below-grade parking garage for the East Building from the private drive on the east side of the building rather than from the previously proposed curb cut on M Street. This private drive will also facilitate trash pickup and loading operations, which will be located adjacent to the garage access. The private drive currently connects to the shared vehicle/pedestrian plaza to the north that operates as one-way eastbound and connects to M Street SW to the south. At M Street, the private drive will operate as right-in/right-out thus no median break on M Street is proposed. The elimination of the curb cut and median break will reduce potential vehicular turning movement conflicts.

As a part of ZC Case 02-38A, vehicular access to the below-grade parking garage for the West Building was proposed to be accessed from a curb-cut on M Street SW. A private drive on the west side of the building was proposed as a connection between the K Street/Makemie Place intersection to the north and to M Street to the south. A connection was proposed from the shared vehicular/pedestrian plaza to the private drive. The private drive was also planned to facilitate trash pickup and loading operations.

The Second-Stage PUD and Modification to the approved First-Stage PUD application proposes vehicular access to the 165 space below-grade parking garage for the West Building will be from the private drive on the west side of the building rather than from the previously proposed curb cut on M Street. This private drive will also facilitate trash pickup and loading operations, which will be located adjacent to the garage access. The private drive currently connects to the K Street/Makemie Place intersection to the north. At M Street, the private drive will operate as right-in/right-out. Additionally, the private drive currently connects to the shared pedestrian/vehicle plaza that connects to 4th Street and operates as one-way westbound.

Figure 9 shows a comparison of the vehicular access points and circulation of the approved First-Stage PUD and proposed Second-Stage PUD and Modification to the approved First-Stage PUD.

The modifications described above result in a significantly improved circulation and site access plan for the M Street Sites. The private drive on the east side of the East Building is existing and the private drive on the west side of the West Building will be extended at its southern end to M Street as part of this development. No additional curb cuts will be located on M Street, and instead, all parking and loading activity will access the M Street Sites via the private drives, which were approved in the First Stage PUD. Additionally, three (3) existing curb cuts along M Street will be abandoned.

This access and circulation plan significantly improves the access plan approved in the First Stage PUD, which included a total of four (4) curb cuts along M Street. Overall, the updated vehicular access plan, which eliminates two (2) curb cuts along M Street, results in a lessened impact along M Street for all roadway users and an improved pedestrian realm.

Pedestrian Access

The primary pedestrian access to the East Building residential lobby is proposed to occur on the northwest corner of the building along 4th Street SW, adjacent to the Waterfront Metro Station entrance. The shared retail/office entrance is proposed to occur along M Street SW. The pedestrian access for East Building is shown on Figure 6.

The primary pedestrian access to the West Building residential lobby is proposed to occur on the northeast corner of the building along 4th Street SW. The shared retail/office entrance is proposed to occur along M Street SW. The pedestrian access for West Building is shown on Figure 7.

Bicycle Access

Bicycle access to the secure long-term bicycle storage facilities for the East Building will be from the private drive on the east side of the building to the below-grade parking garage. Bicycle access to the secure long-term bicycle storage facilities for West Building will be from the private drive on the west side of the building to the below-grade parking garage.

Short-term bicycle parking will be located along the perimeter of both buildings and primarily accessible from the bicycle lanes along 4th Street.

Loading

Truck routing to and from the sites will be focused on designated primary truck routes such as Interstate 395, Maine Avenue, M Street, 9th Street, and South Capitol Street. The East and West Buildings will each provide two (2) 30' loading berths and one 20' service/delivery space that are accessed from the private drives. Loading access from the north-south private drives is consistent with what was approved during the First Stage PUD and is expected for all buildings within the Overall PUD. The location of the loading berths for each building for the Second Stage PUD generally remains the same as the First Stage PUD. Trucks will access public space head in/head out, with no backing maneuvers occurring in public space.

Figure 6 and Figure 7 shows the proposed locations of the loading area for East and West Buildings, respectively.

Figure 10 shows a comparison of the loading access points and circulation of the approved First-Stage PUD and proposed Second-Stage PUD and Modification to the First-Stage PUD.

The amount of loading expected at the M Street Sites is estimated as follows:

- As a baseline, it is expected that there will be three (3) daily truck deliveries at each loading area (covering trash, general shared delivery, and mail).
- Residential loading activity is estimated assuming an expected rental turnover of 18 months, with two (2) trucks per move – one move in and out move out.
- Although the exact nature of individual retail spaces is unknown at this time, it is expected that there will be six (6) individual retail spaces in the East Building and six (6) individual retail spaces in the West Building. General retail stores are expected to generate an additional two (2) deliveries per day in addition to the baseline shared deliveries.
- Office loading activity is estimated assuming 15 van/UPS deliveries and three (3) 30' truck deliveries per week, per building.

Using these estimates, the anticipated loading activity for each loading area is as follows:

- The East Building is expected to generate a loading demand of 18 to 19 trucks per day (of these deliveries approximately 8 are expected to be 30' trucks and 10 to 11 are expected to be 20' service vehicles).
- The West Building is expected to generate a loading demand of 18 to 19 trucks per day (of these deliveries approximately 8 are expected to be 30' trucks and 10 to 11 are expected to be 20' service vehicles).

The estimates of the loading demand above can easily be accommodated by the proposed loading berths for each building. Each 30' berth is expected to accommodate approximately 4 loading activities per day. Vehicles of this size are expected to have an average dwell time of one hour; therefore, the loading demand is not expected to exceed capacity. The 20' service/delivery spaces are expected to accommodate 10 to 11 loading activities per day; however, these deliveries are expected to have a much shorter duration. Therefore, the loading demand is not expected to exceed capacity. As such the loading facilities show in the PUD plans are sufficient to accommodate the demand.

Additionally, this amount of loading berths meets the requirements set forth during the approved First-Stage PUD. The East and West Buildings were each approved with two (2) 30' loading berths. The additional 20' service and delivery space in each building will improve overall loading operations and efficiency over what was originally approved.

Parking

Based on ZR 2016 requirements, the development should provide the following amount of vehicular parking:

- Residential Apartment: 1 space for each 3 dwelling units
- Retail: 1.33 spaces for each 1,000 square feet of retail space
- Office: 0.5 spaces for each 1,000 square feet of office space

Additionally, the proximity to Metrorail results in a 50 percent reduction in the overall parking requirements. As such, the East Building is required to provide 72 parking spaces and West Building is required to provide 69 parking spaces. The developments will exceed these requirements through the provision of the following parking supplies:

- The East Building will provide 198 below-grade parking spaces for residents, office employees and retail patrons. One hundred fifty four (154) of these spaces will be dedicated to residential use (0.5 spaces/dwelling unit); the remaining 44 parking spaces will be allocated towards commercial uses.
- The West Building will provide 165 below-grade parking spaces for residents, office employees and retail patrons. One hundred forty-six (146) of these spaces will be dedicated to residential use (0.49 spaces/dwelling unit); the remaining 19 parking spaces will be allocated towards commercial uses.

Given the quality of transit access to the sites via the adjacent Metrobus stops and Waterfront Metrorail Station, this amount of parking is sufficient to accommodate the parking demand without the unintended consequence of encouraging driving as a mode. Based on the DC Parking Tool (parkrightdc.org), which aggregates local data of parking use and models projected residential parking ratios, the M Street Sites are expected to experience a parking demand of 0.5 spaces/dwelling unit. Therefore, the amount of proposed parking is in line with projected demand.

Both the retail and office use components of the M Street Buildings will be neighborhood-serving. Destination type retail is not anticipated, therefore, patrons and employees are more likely to travel by foot, bicycle, or transit when compared to other commercial spaces that have a larger catchment area.

Of note, the First-Stage PUD approved a minimum parking requirement for the overall project of 1,087 parking spaces. Parking requirements for individual buildings were not determined during the First-Stage PUD. Based on the parking supply of previously constructed parcels of the Overall PUD, and the expected parking supply of all future parcels, the Overall PUD is expected to exceed the minimum parking requirement. Therefore, the amount of parking proposed under the Second-Stage PUD is consistent with what was approved.

Bicycle and Pedestrian Facilities

Bicycle Facilities

Based on ZR 2016 requirements, the development is required to meet the following long-term bicycle parking supplies:

- Residential Apartment: 1 space for each 3 dwelling units up to 50 spaces; 1 space for each 6 dwelling units after 50 spaces
- Retail: 1 space for each 10,000 square feet
- Office: 1 space for each 2,500 square feet

This results in a total requirement of 86 long-term bicycle spaces for the East Building and 85 long-term bicycle spaces for the West Building. The East Building is proposing to include a total of approximately 86 secure long-term spaces for residents in a bicycle storage facility. The West Building is proposing to include a total of approximately 85 secure long-term spaces for residents in a bicycle storage facility. Therefore, the development will meet zoning requirements.

Based on ZR 2016 requirements, the developments should provide the following short-term bicycle parking supplies:

- Residential Apartment: 1 space for each 20 dwelling units up to 50 spaces; 1 space for each 40 dwelling units after 50 spaces
- Retail: 1 space for each 3,500 square feet
- Office: 1 space for each 40,000 square feet

This results in a total requirement of 23 short-term bicycle spaces (in the form of 12 bicycle racks) for the East Building and 23 short-term bicycle spaces (in the form of 12 bicycle racks) for the West Building. The East and West Buildings are proposing to include a total of approximately 23 short-term spaces for each building. These short-term spaces will be provided in the form of inverted U-racks placed along the perimeter of the property. The Applicant will work with DDOT to select the exact location for the racks in public space.

Pedestrian Facilities

Pedestrian facilities will be improved around the sites as part of development of the M Street Sites. Under existing conditions, several curb ramps around the perimeter sites do not meet DDOT and ADA standards and many sidewalks are narrow. As part of the M Street Sites, pedestrian facilities around the perimeter of the sites will be improved to meet DDOT and ADA standards. This includes sidewalks that meet or exceed the width requirements, crosswalks at all necessary locations, curb ramps with detectable warnings, and additional design elements such as streetscape improvements and additional lighting.

Public Realm Improvements

In addition to pedestrian facilities on each of the M Street Sites and directly surrounding the sites, the Applicant is also proposing to improve the public realm within and surrounding the Waterfront Metrorail Station Plaza, including the intersection of 4th Street with the shared pedestrian/vehicle plaza.

The existing and proposed public realm plans are shown on Figure 12. The public realm improvements were vetted with DDOT and are intended to directly address the community's stated concerns. The improvements aim to better delineate vehicular and pedestrian space, while maintaining the unique character of the plaza and to create a safer overall intersection. This is primarily accomplished by reorganizing the pavement types, removing the southern crosswalk, removing the painted median south of the pedestrian refuge, installing planting beds, and installing a raised planting island and pedestrian refuge on the north side of the intersection.

Transportation Demand Management (TDM)

TDM is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM typically focuses 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.

A TDM plan was approved under the First Stage PUD application and the Applicant proposed the following TDM measures for the project:

- Designate a member(s) of the property management team as Property Transportation Coordinator who will be the primary point of contact and will be responsible for coordinating and completing TDM obligations on behalf of the Applicant. The applicant will provide the name of the Property Transportation Coordinator to the District Department of Transportation.
- Provide effective directional signage subject to the Applicant's Comprehensive Sign Plan (parking, deliveries, taxi stand, etc.) to direct residents and visitors to appropriate locations on the property.
- Provide Zip Cars/Flex Cars on site.
- Provide SmartTrip cards, during first time lease-up only, at a maximum cost to the developer of $10.00 per card, per person for free to residents and full-time office employees.
- Encourage new residents and office employees to use Metrorail, Metrobus or DC Circulator services through the following means:
    - Distribute in new-tenant and new-resident packages, materials provided by DDOT including site-specific transit-related information to all persons or entities signing leases;
    - Place a reference to the Waterfront Metro Station in promotional materials and advertisements; and
    - Participate in Ozone Action Days and other regionally sponsored clean air and traffic mitigation promotions by posting notice of such promotions in locations within the building acceptable to the developer.

Since the First Stage PUD TDM measures were approved, TDM best practices have evolved in the District and DDOT has different expectations. Therefore, the Applicant is proposing to update the TDM plan to reflect current DDOT and industry standards. As a part of the modified PUD for the M Street Buildings, the Applicant will provide the following additional/updated TDM measures:

- The Applicant will identify a TDM Leader (for planning, construction, and operations). The TDM Leader will work with residents and tenants of the M Street Buildings to distribute and market various transportation alternatives and options. This includes providing TDM materials to new residents and tenants in a Welcome Package.
- The Applicant will provide enhanced pedestrian treatments and increase pedestrian safety through

pavement treatments, crosswalk changes, and signage at 4th Street in the vicinity of the Metro station and the east-west private driveways.

- The Applicant will provide SmarTrip cards, during first time lease-up only, at a maximum cost to the developer of $20.00 per card, per person for free to residents and full-time office employees.
- The Applicant will post all TDM commitments online, publicize availability, and allow the public to see what commitments have been promised.
- The Applicant will provide website links to CommuterConnections.com and goDCgo.com on property websites.
- The Applicant will install a Transportation Information Center Display (electronic screen) within the residential lobby of the M Street Buildings, containing information related to local transportation alternatives.
- The Applicant will meet the 2016 Zoning Regulations' requirements for short and long-term bicycle parking. This includes secure interior bicycle parking and short-term exterior bicycle parking around the perimeter of the M Street Sites.
- The Applicant will unbundle all parking from the cost of the lease or purchase of residential units. Parking costs will be set at no less than the charges of the lowest fee garage located within a ¼ mile.

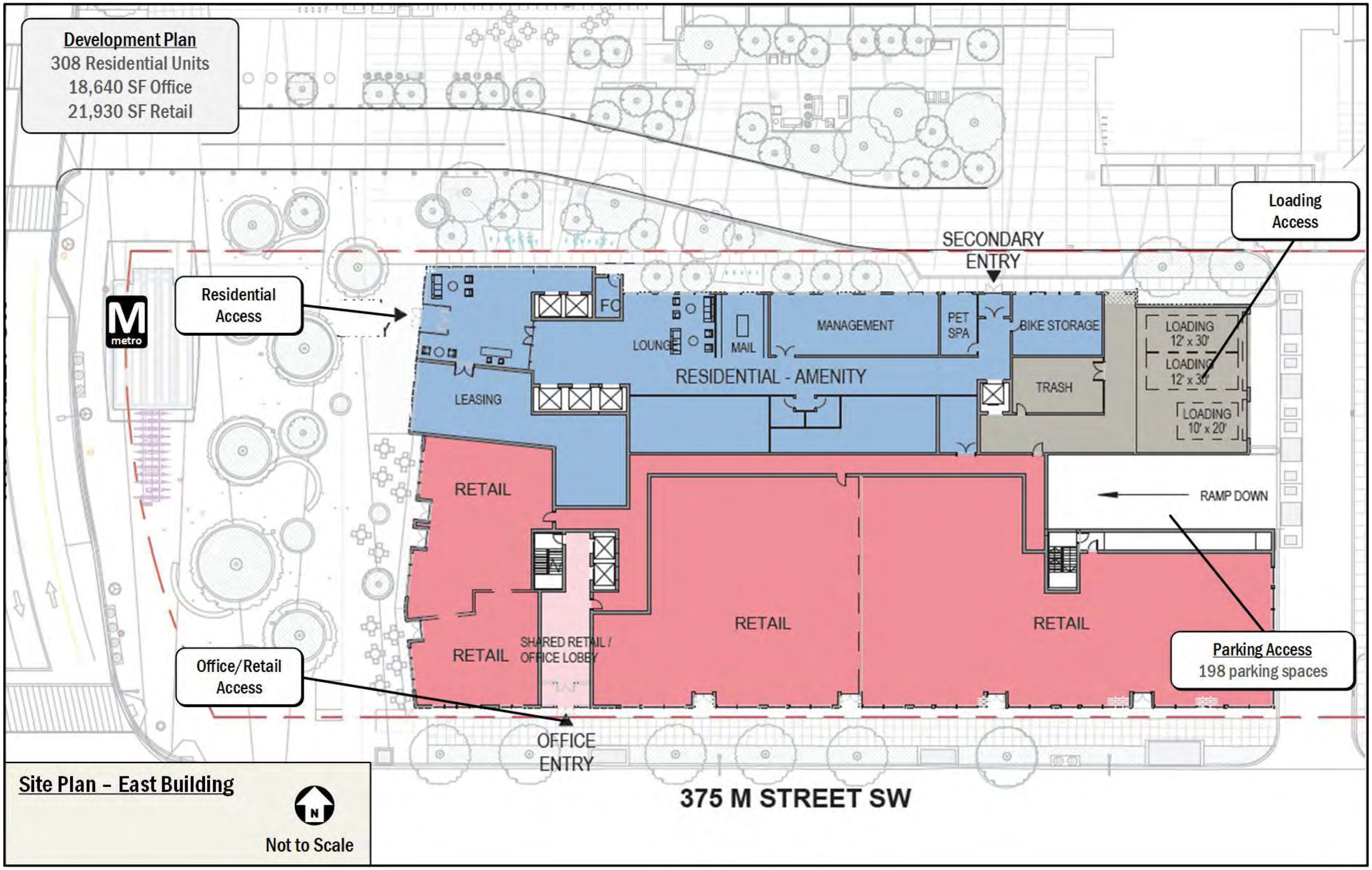

Figure 6: Proposed Site Plan – East Building

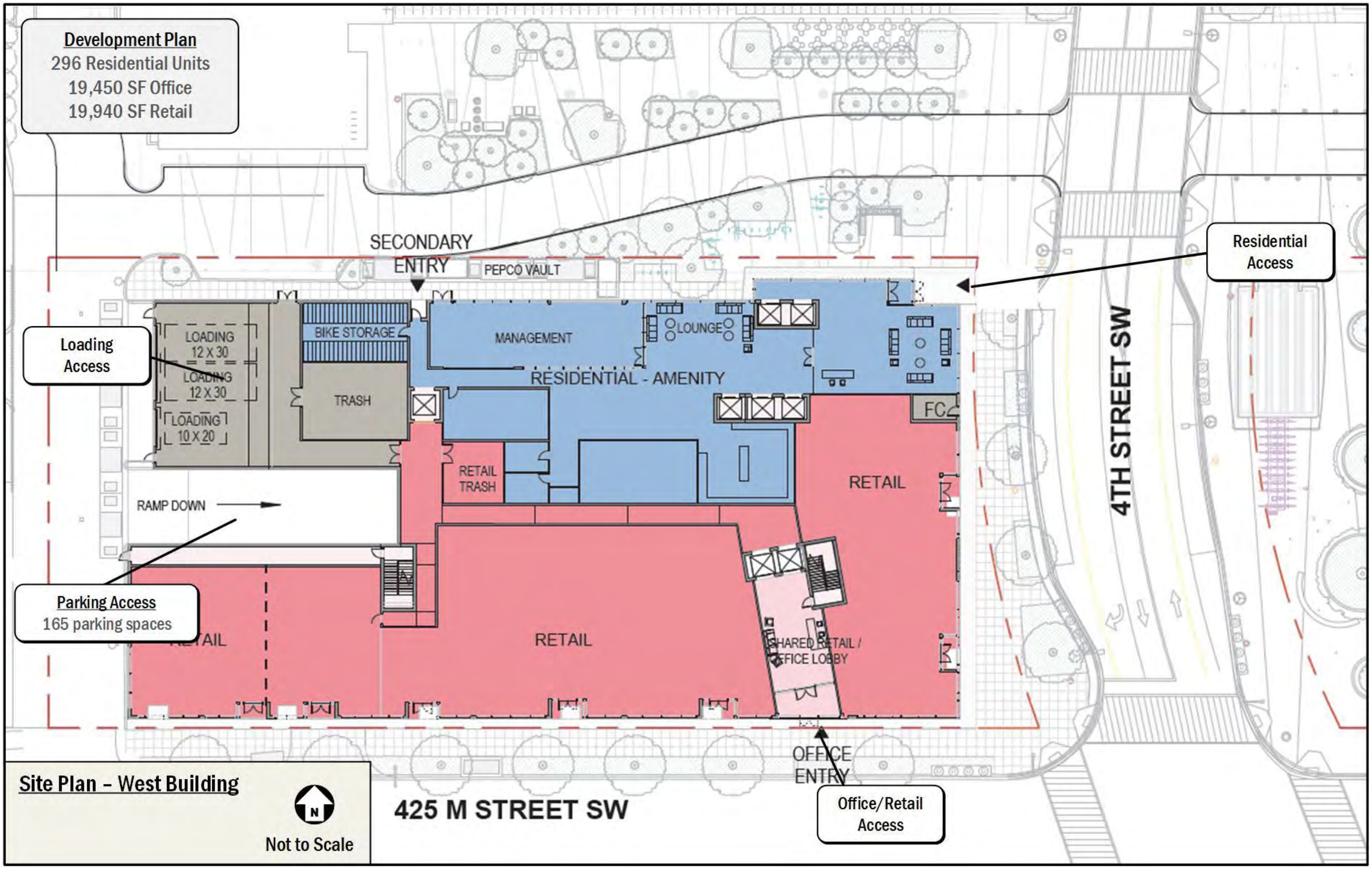

Figure 7: Proposed Site Plan – West Building

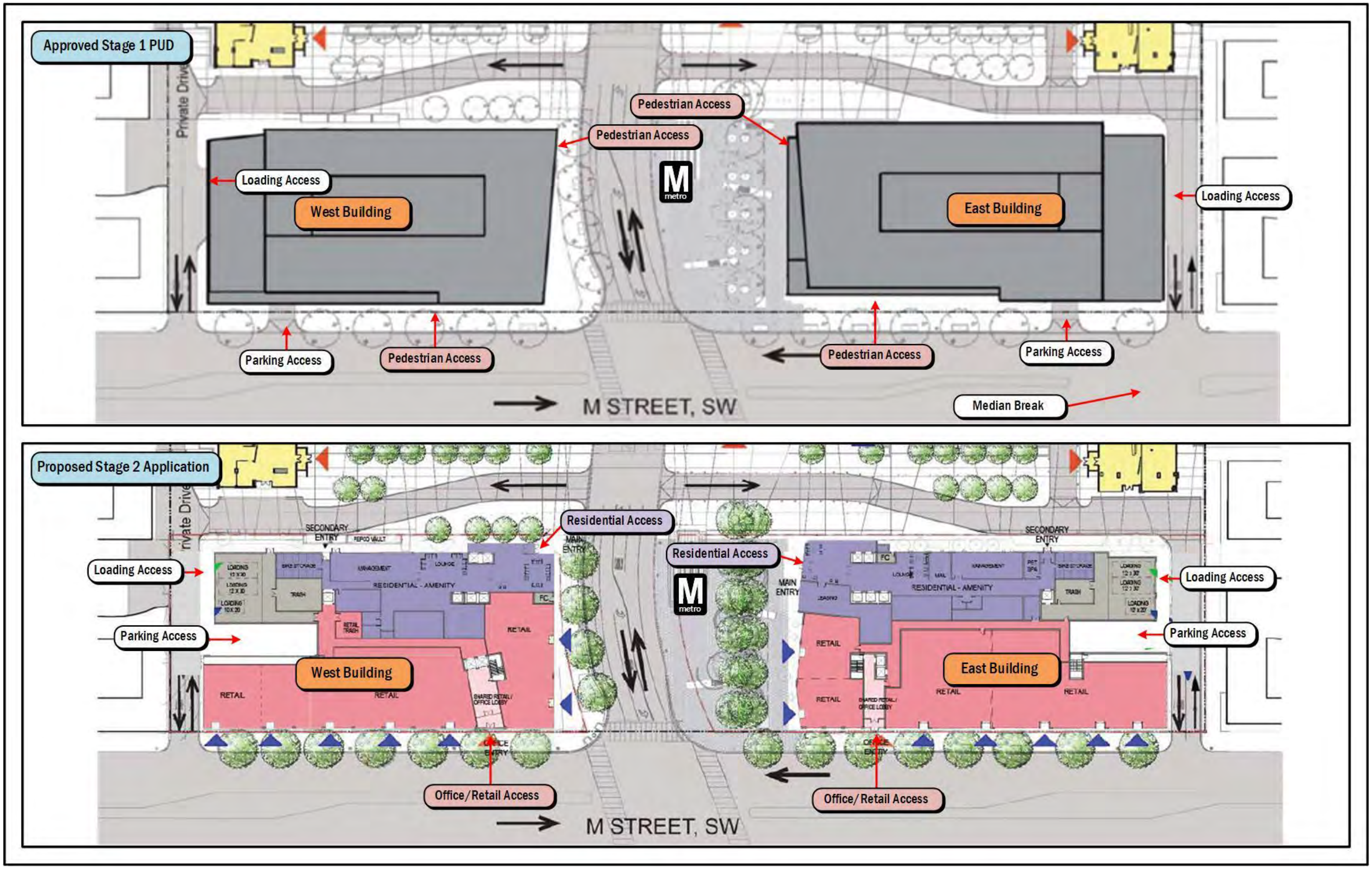

Figure 8: Stage 1/Stage 2 PUD Development Comparison

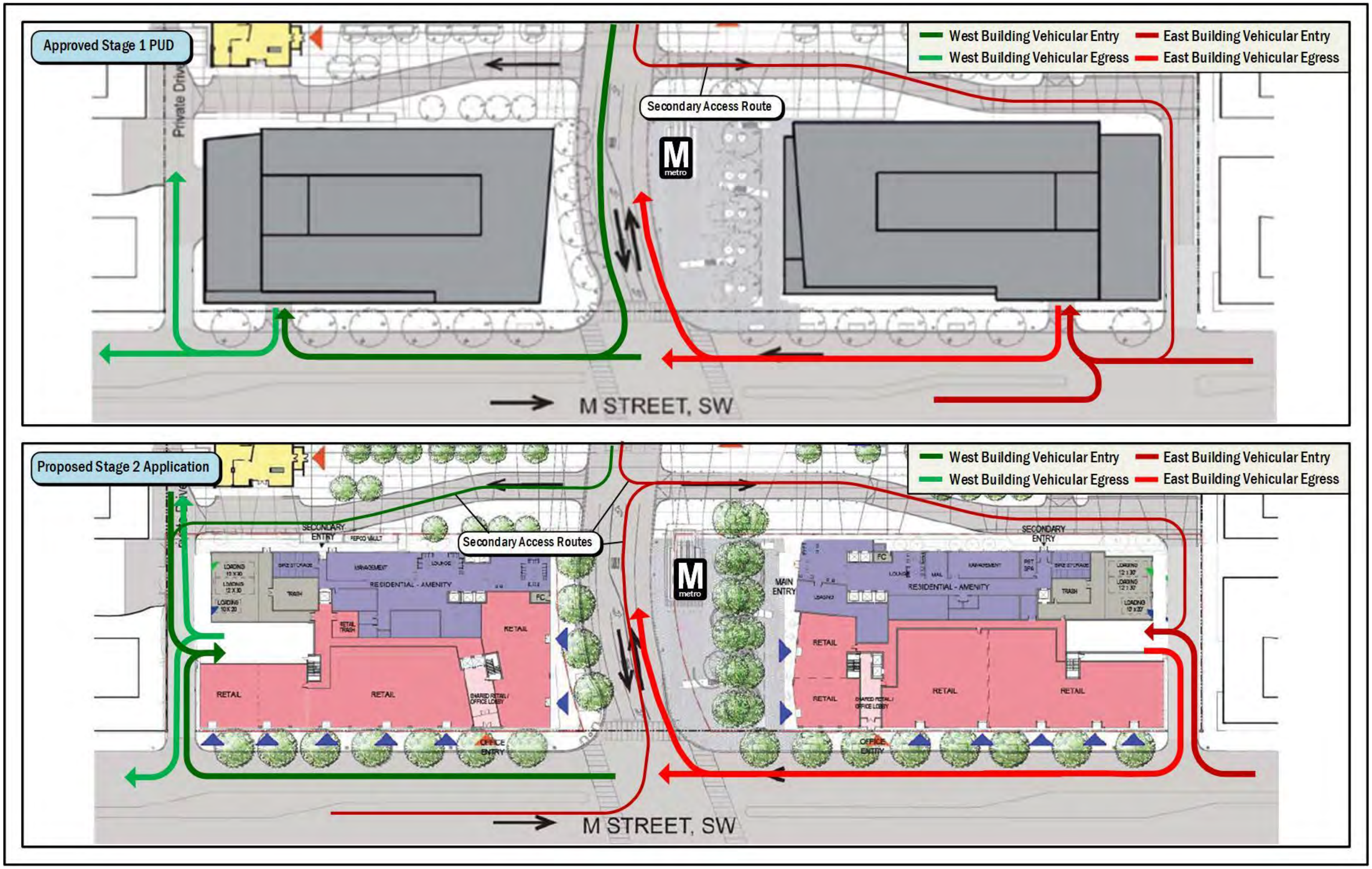

Figure 9: Stage 1/Stage 2 PUD Vehicular Access and Circulation Comparison

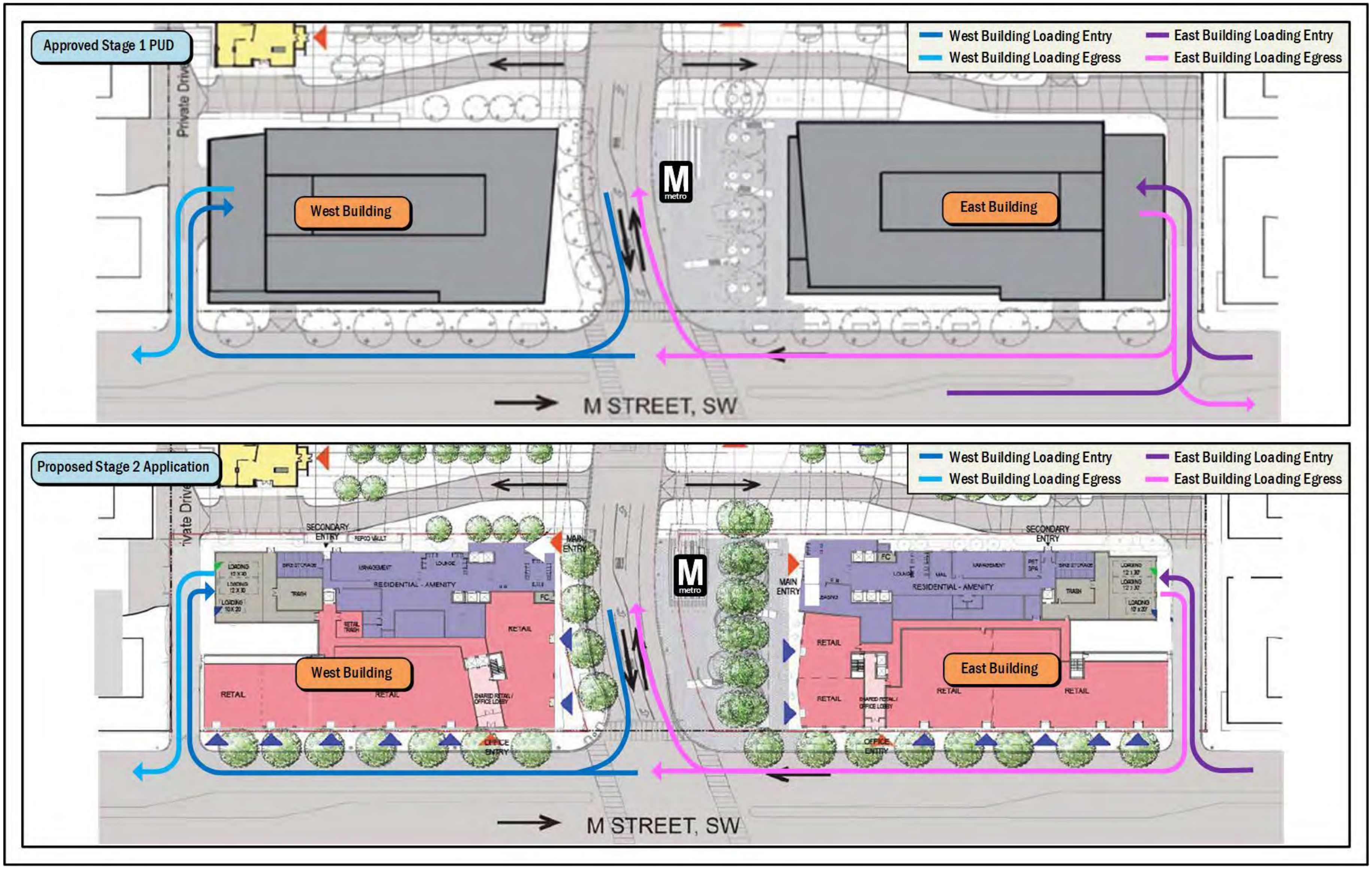

Figure 10: Stage 1/Stage 2 PUD Loading Access and Circulation Comparison

Figure 11: Overall Waterfront Station Site Plan

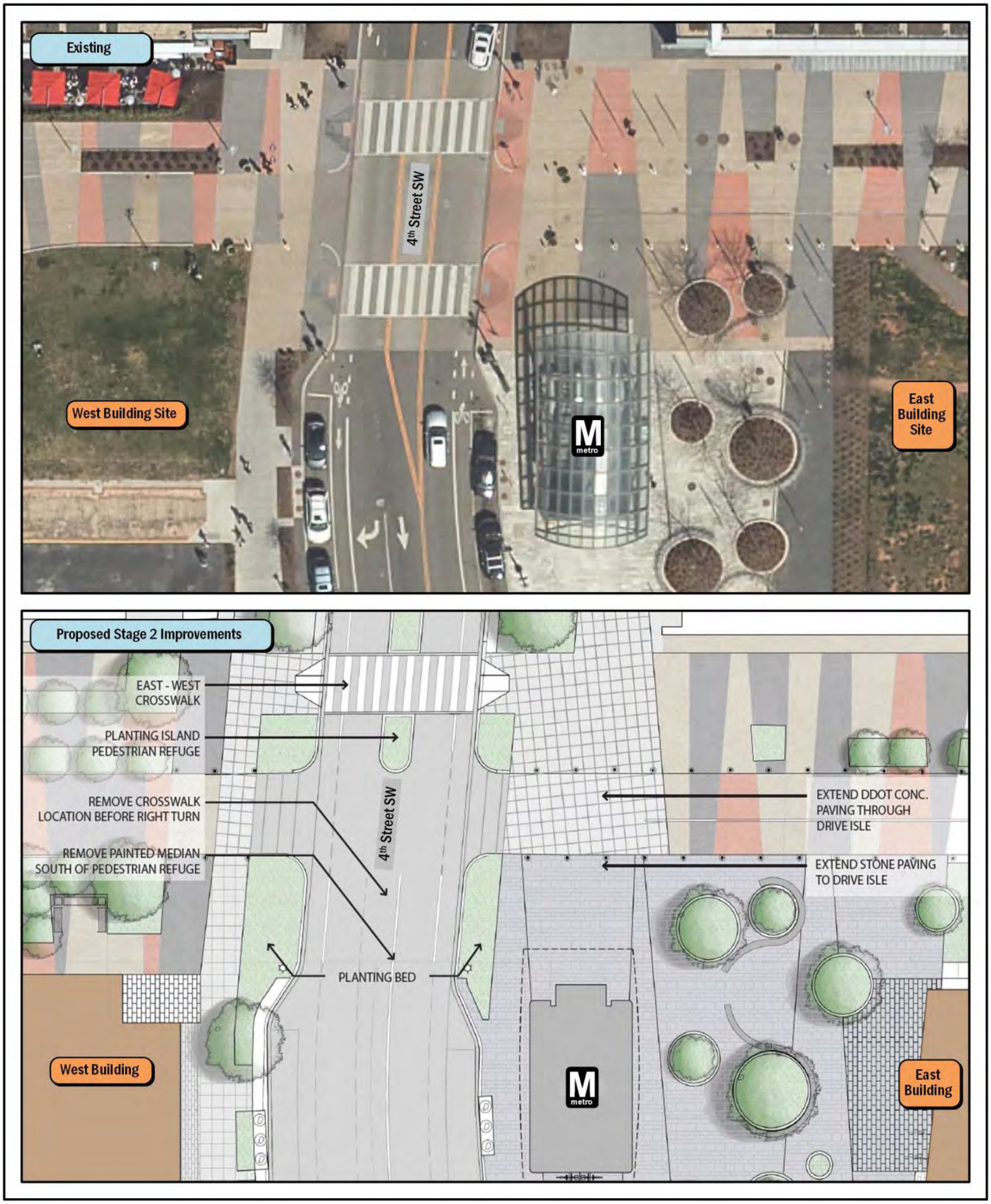

Figure 12: Public Realm Plan

TRIP GENERATION

This section outlines the transportation demand of the M Street Sites. It summarizes the projected trip generation of the sites by mode and land use, 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.

Given that the most recent analysis for the M Street Buildings was completed in 2007, we used updated methodology to determine the projected trip generation. The original analysis assumed that the retail space would generate local pedestrian or transit traffic only and was not included in the vehicular trip generation calculations. Additionally, an 80% non-auto reduction was used for the office use, which would be considered too high under today's standards. The 2007 trip generation is summarized in Table 2 below and an excerpt from the 2007 TIS is included in the Technical Attachments. For comparison purposes, the difference in trip generation between the 2007 development program and the 2017 development program is shown using the updated trip generation/mode split methodology.

As an update to the 2007 trip generation analysis, a multi-modal trip generation methodology was applied using ITE rates for all land uses. Mode split assumptions were based on census data and other resources.

Residential trip generation was calculated based on ITE land use 220, Apartment, splitting trips into different modes using assumptions derived from census data for the residents that currently live near the sites. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail.

Office trip generation was calculated based on ITE land use 710, General office, splitting trips into different modes using assumptions derived from census data for the employees in the region that travel to the sites. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail.

Retail trip generation for the 2017 development program was calculated based on ITE land use 820, Shopping Center, splitting trips into different modes using assumptions based on ridership data.

Proposed trip generation for the East Building assumed 309 apartments, 18,660 square feet of office space, and 21,930 square feet of retail space. Of note, this differs slightly from what was ultimately proposed for the East Building, which includes 308 apartments and 18,640 square feet of office space. The proposed trip generation for the West Building assumed 296 apartments, 19,450 square feet of office space, and 19,940 square feet of retail space. Mode split assumptions are shown in Table 3 and Table 4 for East Building and West Building, respectively. A summary of the multimodal trip generation for the East Building is provided in Table 5 for both peak hours and a summary of the multimodal trip generation for the West Building is provided in Table 6 for both peak hours. A summary of the combined trip generation for both buildings is shown in Table 7. Detailed calculations are included in the Technical Appendix. A summary of the multi-modal trip generation for the 2007 development program using current trip generation methodology is shown on Table 8. A comparison of 2007 vs. 2017 Trip generation Projections using current trip gen methodology is shown in Table 9.

The change in land use results in a shift in the inbound/outbound trip generation. This is expected given the change from primarily office use to primarily residential use (i.e there are more people leaving the sites in the morning than coming to the sites). However, the overall vehicular trip generation significantly decreases as a result of the updated development program when compared using consistent mode split methodology. Industry standards show that when all other factors are the same, residential land uses generate fewer vehicular trips than office land uses.

Table 2: 2007 TIS Trip Generation Projections

Building		AM Peak Hour			PM Peak Hour		
		IB trips	OB trips	Total Trips	IB trips	OB trips	Total Trips
East Building	Total Trips	400	54	454	71	346	417
	80% Reduction	*-320*	*-43*	*-363*	*-57*	*-277*	*-334*
	Vehicle Trips	**80**	**11**	**91**	**14**	**69**	**83**
West Building	Total Trips	426	58	484	76	369	445
	80% Reduction	*-341*	*-46*	*-387*	*-61*	*-295*	*-356*
	Vehicle Trips	**85**	**12**	**97**	**15**	**74**	**89**
Total	Total Trips	826	112	938	147	715	862
	80% Reduction	*-661*	*-89*	*-750*	*-118*	*-572*	*-690*
	Vehicle Trips	**165**	**23**	**188**	**29**	**143**	**172**

Table 3: Proposed Mode Split – East Building

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential Mode Split	45%	35%	5%	15%
Retail Mode Split	30%	35%	5%	30%
Office Mode Split	50%	45%	2%	3%

Table 4: Proposed Mode Split – West Building

Land Use	Mode			
	Drive	Transit	Bike	Walk
Residential Mode Split	45%	35%	5%	15%
Retail Mode Split	30%	35%	5%	30%
Office Mode Split	50%	45%	2%	3%

Table 5: 2017 Trip Generation Summary – East Building

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	*Apartments*	14 veh/hr	56 veh/hr	70 veh/hr	55 veh/hr	29 veh/hr	84 veh/hr
	Retail	4 veh/hr	2 veh/hr	6 veh/hr	12 veh/hr	12 veh/hr	24 veh/hr
	Office	13 veh/hr	2 veh/hr	15 veh/hr	3 veh/hr	11 veh/hr	14 veh/hr
	Total	**31 veh/hr**	**60 veh/hr**	**91 veh/hr**	**70 veh/hr**	**52 veh/hr**	**122 veh/hr**
Transit	*Apartments*	12 ppl/hr	49 ppl/hr	61 ppl/hr	48 ppl/hr	26 ppl/hr	74 ppl/hr
	Retail	8 ppl/hr	5 ppl/hr	13 ppl/hr	24 ppl/hr	26 ppl/hr	50 ppl/hr
	Office	13 ppl/hr	2 ppl/hr	15 ppl/hr	3 ppl/hr	11 ppl/hr	14 ppl/hr
	Total	**33 veh/hr**	**56 veh/hr**	**89 veh/hr**	**75 veh/hr**	**63 veh/hr**	**138 ppl/hr**
Bike	*Apartments*	2 ppl/hr	7 ppl/hr	9 ppl/hr	7 ppl/hr	4 ppl/hr	11 ppl/hr
	Retail	1 ppl/hr	1 ppl/hr	2 ppl/hr	3 ppl/hr	4 ppl/hr	7 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Total	**4 veh/hr**	**8 veh/hr**	**12 veh/hr**	**10 veh/hr**	**9 veh/hr**	**19 ppl/hr**
Walk	*Apartments*	5 ppl/hr	21 ppl/hr	26 ppl/hr	21 ppl/hr	11 ppl/hr	32 ppl/hr
	Retail	7 ppl/hr	4 ppl/hr	11 ppl/hr	21 ppl/hr	22 ppl/hr	43 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Total	**13 veh/hr**	**25 veh/hr**	**38 veh/hr**	**42 veh/hr**	**34 veh/hr**	**76 ppl/hr**

Table 6: 2017 Trip Generation Summary – West Building

Mode	Land Use	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Auto	*Apartments*	13 veh/hr	54 veh/hr	67 veh/hr	52 veh/hr	29 veh/hr	81 veh/hr
	Retail	3 veh/hr	3 veh/hr	6 veh/hr	11 veh/hr	11 veh/hr	22 veh/hr
	Office	13 veh/hr	2 veh/hr	15 veh/hr	3 veh/hr	12 veh/hr	15 veh/hr
	Total	**29 veh/hr**	**59 veh/hr**	**88 veh/hr**	**66 veh/hr**	**52 veh/hr**	**118 veh/hr**
Transit	*Apartments*	12 ppl/hr	47 ppl/hr	59 ppl/hr	46 ppl/hr	25 ppl/hr	71 ppl/hr
	Retail	7 ppl/hr	5 ppl/hr	12 ppl/hr	22 ppl/hr	24 ppl/hr	46 ppl/hr
	Office	13 ppl/hr	2 ppl/hr	15 ppl/hr	3 ppl/hr	12 ppl/hr	15 ppl/hr
	Total	**32 ppl/hr**	**54 ppl/hr**	**86 ppl/hr**	**71 ppl/hr**	**61 ppl/hr**	**132 ppl/hr**
Bike	*Apartments*	2 ppl/hr	6 ppl/hr	8 ppl/hr	7 ppl/hr	3 ppl/hr	10 ppl/hr
	Retail	1 ppl/hr	1 ppl/hr	2 ppl/hr	3 ppl/hr	4 ppl/hr	7 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Total	**4 ppl/hr**	**7 ppl/hr**	**11 ppl/hr**	**10 ppl/hr**	**8 ppl/hr**	**18 ppl/hr**
Walk	*Apartments*	5 ppl/hr	20 ppl/hr	25 ppl/hr	20 ppl/hr	10 ppl/hr	30 ppl/hr
	Retail	6 ppl/hr	4 ppl/hr	10 ppl/hr	19 ppl/hr	21 ppl/hr	40 ppl/hr
	Office	1 ppl/hr	0 ppl/hr	1 ppl/hr	0 ppl/hr	1 ppl/hr	1 ppl/hr
	Total	**12 ppl/hr**	**24 ppl/hr**	**36 ppl/hr**	**39 ppl/hr**	**32 ppl/hr**	**71 ppl/hr**

Table 7: 2017 Combined Trip Generation Summary

Mode	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Auto	60 veh/hr	119 veh/hr	179 veh/hr	136 veh/hr	104 veh/hr	240 veh/hr
Transit	65 ppl/hr	110 ppl/hr	175 ppl/hr	146 ppl/hr	124 ppl/hr	270 ppl/hr
Bike	8 ppl/hr	15 ppl/hr	23 ppl/hr	20 ppl/hr	17 ppl/hr	37 ppl/hr
Walk	25 ppl/hr	49 ppl/hr	74 ppl/hr	81 ppl/hr	66 ppl/hr	147 ppl/hr

Table 8: 2007 Trip Generation Summary (using current trip gen methodology)

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Auto	*Office*	418 veh/hr	56 veh/hr	474 veh/hr	72 veh/hr	356 veh/hr	428 veh/hr
	Retail	6 veh/hr	6 veh/hr	12 veh/hr	22 veh/hr	22 veh/hr	44 veh/hr
	Total	**424 veh/hr**	**62 veh/hr**	**486 veh/hr**	**94 veh/hr**	**378 veh/hr**	**472 veh/hr**
Transit	*Office*	424 veh/hr	59 veh/hr	483 veh/hr	74 veh/hr	360 veh/hr	434 veh/hr
	Retail	14 veh/hr	10 veh/hr	24 veh/hr	44 veh/hr	48 veh/hr	40 veh/hr
	Total	**438 veh/hr**	**69 veh/hr**	**507 veh/hr**	**118 veh/hr**	**408 veh/hr**	**474 veh/hr**
Bike	*Office*	19 veh/hr	2 veh/hr	21 veh/hr	4 veh/hr	15 veh/hr	19 veh/hr
	Retail	2 veh/hr	2 veh/hr	4 veh/hr	6 veh/hr	8 veh/hr	14 veh/hr
	Total	**21 veh/hr**	**4 veh/hr**	**25 veh/hr**	**10 veh/hr**	**23 veh/hr**	**33 veh/hr**
Walk	*Office*	28 veh/hr	4 veh/hr	32 veh/hr	5 veh/hr	24 veh/hr	29 veh/hr
	Retail	12 veh/hr	8 veh/hr	20 veh/hr	38 veh/hr	42 veh/hr	80 veh/hr
	Total	**40 veh/hr**	**12 veh/hr**	**52 veh/hr**	**43 veh/hr**	**66 veh/hr**	**109 veh/hr**

Table 9: Comparison of 2007 vs. 2017 Trip generation Projections (using current trip gen methodology)

Mode	Land Use	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
2017	*Auto*	60 veh/hr	119 veh/hr	179 veh/hr	136 veh/hr	104 veh/hr	240 veh/hr
	Non-Auto	98 ppl/hr	174 ppl/hr	272 ppl/hr	247 ppl/hr	207 ppl/hr	454 ppl/hr
2007	*Auto*	424 veh/hr	62 veh/hr	486 veh/hr	94 veh/hr	378 veh/hr	472 veh/hr
	Non-Auto	499 ppl/hr	85 ppl/hr	584 ppl/hr	171 ppl/hr	497 ppl/hr	616 ppl/hr
Difference	***Auto***	**-364 veh/hr**	**57 veh/hr**	**-307 veh/hr**	**42 veh/hr**	**-274 veh/hr**	**-232 veh/hr**
	Non-Auto	**-401 ppl/hr**	**89 ppl/hr**	**-312 ppl/hr**	**76 ppl/hr**	**-290 ppl/hr**	**-162 ppl/hr**

Traffic Operations

This section provides a summary of an analysis of the existing and future roadway capacity surrounding the sites. Included is an analysis of potential vehicular impacts of the M Street Sites and a discussion of potential mitigations.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the proposed development on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips so that they do not create any adverse traffic impacts.

This analysis was accomplished by determining the traffic volumes and roadway capacity for existing conditions, background conditions, and future conditions.

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

Of note, vehicular capacity analyses performed during the Stage 1 PUD approvals did not identify specific impacts or mitigations for these individual buildings. Instead, mitigation measures for the overall development were recommended. The primary mitigation identified was the reintroduction of 4th Street between I Street and M Street SW. This mitigation was completed during a previous phase of the Overall PUD. Mitigation measures for each individual building or phase were expected to be determined during each subsequent Stage 2 PUD application. As such, this CTR identifies any additional mitigation measures necessary for the M Street Buildings, in addition to the Overall PUD mitigations.

The following conclusions are reached within this chapter:

Existing Conditions

- This scenario evaluates vehicular operations as they occur today in 2017 conditions.
- Two (2) intersections operate at unacceptable conditions in existing conditions:
    - <u>*M Street & 4th Street, SW*</u>
      During the AM peak hour, the westbound and northbound approaches operate at unacceptable levels of service. During the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
    - <u>*M Street & 3rd Street, SW*</u>
      During the PM peak hour, the southbound approach operates at unacceptable levels of service.

Background Conditions

- This scenario evaluates vehicular operations as they are forecasted to occur in future 2019 conditions assuming <u>no</u> development of the M Street Sites.
- Four (4) intersections operate at unacceptable conditions under background conditions, due to the addition of background development-related trips and inherent growth on the roadway network:
    - <u>*I Street & 7th Street, SW*</u>
      During the PM peak hour, the southbound approach operates at unacceptable levels of service.
    - <u>*Maine Avenue & 7th Street, SW*</u>
      During the PM peak hour, the southbound approach operates at unacceptable levels of service.
    - <u>*M Street & 4th Street, SW*</u>
      Consistent with existing conditions, during the AM peak hour, the westbound and northbound approaches operate at unacceptable levels of service. Additionally, the overall intersection degrades to unacceptable levels of service.
      Consistent with existing conditions, during the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
    - <u>*M Street & 3rd Street, SW*</u>
      Consistent with existing conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service.

Future Conditions

- As discussed in the previous section, the overall vehicular trip generation significantly decreases as a result of the change in land use. Industry standards show that when all other factors are the same, residential land uses generated fewer vehicular trips than office land uses.

- This scenario evaluates vehicular operations as they are forecasted to occur in future 2019 conditions <u>with</u> the addition of new trips generated by the M Street Sites.
- Four (4) intersections operate at unacceptable conditions under future conditions, due to the addition of trips generated by the M Street Buildings:
  - *<u>I Street & 7th Street, SW</u>*
    Consistent with the background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. Additionally, the overall intersection degrades to unacceptable levels of service. Therefore, this intersection is impacted by the addition of site-generated trips during the PM peak hour.
  - *<u>Maine Avenue & 7th Street, SW</u>*
    Consistent with background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. The addition of site-generated trips is not expected to increase the southbound approach delay by more than 5 seconds over the background conditions. Therefore, this intersection is not considered to be impacted by the addition of site-generated trips according to DDOT standards.
  - *<u>M Street & 4th Street, SW</u>*
    Consistent with background conditions, during the AM peak hour, the westbound and northbound approaches, as well as the overall intersection operate at unacceptable levels of service.
    Consistent with existing conditions, during the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
    During the AM peak hour only, the overall intersection and westbound approach delays increase by more than 5 seconds over the background conditions. Therefore, this intersection is impacted by the addition of site-generated trips during the AM peak hour. Delay experienced during the PM peak hour does not increase by more than 5 seconds over the background conditions.
  - *<u>M Street & 3rd Street, SW</u>*
    Consistent with background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. The addition of site-generated trips is not expected to increase the southbound approach delay by more than 5 seconds over the background conditions. Therefore, this intersection is not considered to be impacted by the addition of site-generated trips.
- As stated above, development of the M Street Sites will impact two (2) study intersections by increasing traffic at specific peak-hour time periods. The intersection at M and 4th Streets SW will be impacted in the morning peak hour, and the intersection at I and 7th Streets SW will be impacted in the afternoon peak hour.
- The intersection of M Street & 4th Street operates at unacceptable levels of service in existing conditions during both the AM and PM peak hours and is exacerbated by the addition of trips generated by future background developments and the M Street Sites. Only during the AM peak hour does the delay increase such that mitigation measures are required. The proposed mitigation measure for the M Street & 4th Street intersection is to shift green time to the east-west approaches. Adjusting signal timing in this manner will decrease delay to levels that are improved over background conditions, and therefore sufficiently mitigates the additional trips generated by development of the M Street Sites.
- The intersection of 7th and I Street operates at acceptable conditions under existing conditions. Under background conditions the intersection operates at unacceptable levels of service during and is further exacerbated by the addition of trips generated by the M Street Sites. The proposed mitigation measure at 7th Street & I Street is to extend the signal cycle length from 75 seconds to 120 seconds, which is consistent with the adjacent intersections along 7th Street. This mitigation results in acceptable levels of service under future conditions, and it is recommended that DDOT implement changes to the signal cycle as part of implementing the signal and intersection improvements at this location associated with the 680 I Street SW PUD.

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 coordinated with 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 are performed to determine if development of the M Street Sites will lead to adverse impacts on traffic operations. (A review of impacts to each of the other modes is outlined later in this report.) This is accomplished by comparing future scenarios: (1) without the proposed development (referred to as the Background condition) and (2) with the development approved and constructed (referred to as the Future condition).

Specifically, the roadway capacity analysis examined the following scenarios:

1. 2017 Existing Conditions
2. 2019 Future Conditions without the development (2019 Background Conditions)
3. 2019 Future Conditions with the development (2019 Total Future Conditions)

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 proposed development. Although it is possible that impacts will occur outside of the study area, those impacts are not significant enough to be considered a detrimental impact nor worthy of mitigation measures.

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

1. I Street & 7th Street, SW
2. I Street & 6th Street, SW
3. I Street & Makemie Place, SW
4. I Street & 4th Street, SW
5. I Street & 3rd Street, SW
6. K Street & 6th Street, SW
7. K Street & Makemie Place, SW
8. 4th Street & Pedestrian Plaza, SW
9. Maine Avenue & 7th Street, SW
10. M Street / Maine Avenue & 6th Street, SW
11. M Street & West Alley, SW (Future)
12. M Street & 4th Street, SW
13. M Street & East Alley, SW
14. M Street & 3rd Street, SW

Figure 13 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

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

The lane configurations and traffic controls for the Existing Conditions are shown on Figure 20.

2019 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 proposed development.

Based on these criteria, one background improvement was included in the 2019 Background conditions. The intersection of 7th Street & I Street SW will be improved as part of the 680 Eye Street development. The channelized northbound right turn lane will be removed, resulting in a northbound approach of one thru lane and one thru-right lane. This improvement will be included in the background scenario. The lane configurations and traffic controls for the 2019 Background conditions are shown on Figure 21.

2019 Total Future Geometry and Operations Assumptions

The configurations and traffic controls for the 2019 Total Future conditions are based on those for the 2019 Background conditions.

The lane configurations and traffic controls for the 2019 Total Future Conditions are consistent with Background conditions and shown on Figure 21.

Traffic Volume Assumptions

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

Existing Traffic Volumes

The existing traffic volumes are comprised of turning movement count data, which was collected on Tuesday, May 23, 2017 and Thursday, June 8, 2017 between the hours of 6:30 and 9:30 in the morning and 4:00 and 7:00 in the afternoon/evening. The results of the traffic counts are included in the Technical Attachments. The existing peak hour traffic volumes are shown Figure 14. For all intersections, the individual morning, afternoon/evening peak hours were used.

2019 Background Traffic Volumes without the project (2019 Background)

The traffic projections for the 2019 Background conditions consist of the existing volumes with two additions:

- Traffic generated by developments expected to be completed prior to 2019 (known as background developments); and
- Inherent growth on the roadway (representing regional traffic growth).

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 proposed development.

Based on these criteria, and as discussed previously, nine (9) developments were included in the 2019 Background scenario:

1. The View at Waterfront
2. Eliot on 4th
3. 1004 4th Street SW – Town Center East
4. Town Center
5. 301 M Waterfront
6. St. Matthews Evangelical Lutheran Church Redevelopment
7. 680 I (Eye) Street SW
8. The Wharf (Phase 1)
9. The Wharf (Phase 2)

Existing studies were available for all background developments. Trip generation and distribution assumptions for the background developments were based on their respective studies and altered where necessary based on updated travel patterns. Mode split and trip generation assumptions for the background developments are shown in Table 10.

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 (MWCOG) currently adopted regional transportation model, comparing the difference between the year 2017 and 2020 model scenarios. 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 11. Additionally, a 0.10 percent per year growth rate was applied to through traffic along all other study area roadways that were not included in the MWCOG regional transportation model.

The traffic volumes generated by the inherent growth along the network were added to the existing traffic volumes in order to establish the 2019 Background traffic volumes. The traffic volumes for the 2019 Background conditions are shown on Figure 15.

2019 Total Future Traffic Volumes with the project (2019 Total Future)

The 2019 Total Future traffic volumes consist of the 2019 Background volumes with the addition of the traffic volumes generated by the proposed project (site-generated trips). Thus, the 2019 Total Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and site-generated trips of the proposed project.

Trip distribution for the site-generated trips was determined based on: (1) CTPP Traffic Analysis Zone (TAZ) data, (2) existing and future travel patterns in the study area, and (3) the location of the parking access. Trip distribution was determined for each land use individually.

The residential trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting from the site's

TAZ, and adjusted based on traffic volumes and patterns. The origin of outbound and destination of inbound residential vehicular trips was the below-grade parking garage for each building, accessible along the private drives connecting to M Street and 4th Street. The flow information showed significant commuting patterns to downtown DC, Arlington County, VA, and Prince George's County, MD.

The office distribution was influenced significantly be the CTPP TAZ flow data for drivers commuting to the site's TAZ, and adjusted based on traffic volumes and patterns. The origin of outbound and destination of inbound office vehicular trips was the below-grade parking garage for each building, accessible along the private drives connecting to M Street and 4th Street. The flow information showed significant commuting patterns from DC, Montgomery and Prince George's County Maryland, and Arlington and Fairfax County, Virginia.

The retail distribution was primarily based on locations of other nearby retail centers and residential communities, with some influence on the CTPP flow data for drivers commuting to the site's TAZ (representing retail employees that drive). The origin of outbound and destination of inbound retail vehicular trips was the below-grade parking garage for each building, accessible along the private drives connecting to M Street and 4th Street. The retail trip distribution is more heavily weighted towards the neighborhoods north and west of the development.

The inbound and outbound trip distribution for East Building is shown on Figure 16 and Figure 17, respectively. The inbound and outbound trip distribution for the West Building is shown on Figure 18 and Figure 19, respectively.

The traffic volumes for the 2019 Total Future conditions were calculated by adding the development-generated traffic volumes for the M Street Sites to the 2019 Background traffic volumes. Thus, the future condition with the proposed development scenario includes traffic generated by: existing volumes, background developments through the year 2019, inherent growth on the network, and the proposed developments. The site-generated traffic volumes for M Street Sites are shown on Figure 22. The 2019 Total Future traffic volumes are shown on Figure 23.

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed for the scenarios outlined previously at the intersections contained within the study area during the morning and afternoon peak hours. Synchro version 9.1 was used to analyze the study intersections based on the *Highway Capacity Manual* (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 peak hour traffic volumes; (2) the lane use and traffic controls; and (3) the Highway Capacity Manual (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 study scenarios. The capacity analysis results are shown on Figure 26 for the morning peak hour, and Figure 27 for the afternoon peak hour.

The study intersections generally operate at acceptable conditions during the morning and afternoon peak hours for all study scenarios. However, four (4) intersections have at least one approach that operates under unacceptable conditions during at least one study scenario and during at least one of the peak hours:

- *I Street & 7th Street SW*
  During the afternoon peak period, the southbound approach of 7th Street operates at unacceptable levels

during the Background and Total Future study scenarios. This can be attributed to the high amount of southbound left turns present. The intersection is signalized without a dedicated southbound left protected phase or lane, resulting in vehicles waiting for a suitable gap in northbound through traffic in order to make the turn. Trips generated by the M Street Sites routed through this intersection exasperated delays observed in the Background scenario.

- *Maine Avenue & 7th Street SW*
  During the afternoon peak period, the southbound approach operates at unacceptable levels during the Background and Total Future study scenarios. This can be attributed to the addition of traffic generated from background developments, including The Wharf Phase 1 and 2, to which southbound through traffic leads to. Traffic generated by the M Street Sites added to the southbound approach at this intersection is minimal, with only four vehicles in both the morning and afternoon peak hour making a southbound right onto westbound Maine Avenue.

- *M Street & 4th Street SW*
  During the morning and afternoon peak periods, multiple approaches operate at unacceptable levels in all study scenarios. In the morning peak period, westbound and northbound approaches operate at unacceptable conditions during all three study scenarios, with the eastbound and westbound approaches operating unacceptably in all scenarios during the afternoon peak period. This can be attributed to the usage of M Street as a commuter route, resulting in heavy volumes in the peak direction during the commuter peak hour. Traffic generated by the M Street Sites utilizes this intersection with vehicles making an eastbound left or westbound right to access the development driveways.

- *M Street & 3rd Street SW*
  During the afternoon peak period, the southbound approach of 3rd Street operates at unacceptable levels during all study scenarios. This can be attributed to all southbound turning movements (left, through, and right) made from one lane. A majority of turns made at the southbound approach are left turns, which must wait for a gap in northbound traffic before making the turn. No traffic generated by the M Street Sites is routed to this approach in the Total Future scenario.

Queuing Analysis
In addition to the capacity analyses presented above, a queuing analysis was performed at the study intersections. The queuing analysis was performed using Synchro software. The 50th percentile and 95th percentile queue lengths are shown for each lane group at the study area signalized intersections. The 50th percentile queue is the maximum back of queue on a median cycle. The 95th percentile queue is the maximum back of queue that is exceeded 5% of the time. For unsignalized intersection, only the 95th percentile queue is reported for each lane group (including free-flowing left turns and stop-controlled movements) based on the HCM 2000 calculations. HCM 2000 does not calculate queuing for all-way stops.

Table 13 shows the queuing results for the study area intersections. Three (3) of the study intersections have one or more lanes group that exceed the given storage length during at least one peak hour in all of the study scenarios. These intersections are as follows:

- Maine Avenue & 7th Street SW (morning and afternoon)
- I Street & 4th Street SW (afternoon)
- M Street & 4th Street SW (afternoon)

Mitigations and Improvements

Based on DDOT standards, the proposed development 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 where one does not exist in the existing or background conditions;
- There is an increase in delay at any approach or overall intersection operating under LOS E or F of greater than 5 seconds when compared to the background scenario; or
- There is an increase in the 95th percentile queues by more than 150 feet at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the background scenario.

Following these guidelines, there are impacts to two (2) intersections as a result of the development. Mitigation measures were tested at these intersections, with results shown on Table 14, queuing results for the mitigation measures shown on Table 15, and detailed Synchro reports included in the Technical Attachments. The following conclusions were made:

- <u>*I Street & 7th Street, SW*</u>

  The southbound approach of 7th Street is shown to operate under LOS F during the afternoon peak period for the Background and Total Future scenarios. The delay observed under the Total Future scenario increases by more than 5 seconds when compared to the Background scenarios. Additionally, the overall delay degrades from LOS D in the Background scenario to an unacceptable LOS E. Therefore, this intersection triggers the need to explore mitigation measures.

  The large number of vehicles making an unprotected southbound left turn at the intersection contributes to the poor LOS observed in the two scenarios. Increasing the cycle length of the intersection from 75 seconds to 120 seconds in the afternoon peak period (the same amount allocated in the morning peak period) reduces delay along the southbound approach, giving more time for drivers to make southbound left turn when given a gap in northbound through traffic. This change in signal timing will not adversely affect the busier 7th Street and Maine Avenue SW intersection as this intersection also operates with a 120 second cycle during the afternoon peak hour. This report recommends that the signal cycle length at this intersection be extended to 120 seconds as part of the background roadway improvements, which include traffic signal modifications and lane configuration upgrades in conjunction with the 680 Eye Street SW development.

- <u>*M Street & 4h Street, SW*</u>

  Under existing conditions, the westbound and northbound approaches operate at unacceptable levels of service during the AM peak hour. The eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service during the PM peak hour.

  Under Background Conditions, the overall intersection degrades to unacceptable levels of service during the AM peak hour.

  Under Total Future Conditions, the delay observed along the westbound approach and overall intersection increases by more than 5 seconds during the AM peak hour when compared to the Background Conditions. Therefore, this intersection triggers the need to explore mitigation measures. Of note, the delay was not observed to increase by more than 5 seconds during the PM peak hour.

  This delay is a result of the large volume of westbound vehicles utilizing M Street as a commuter route in the morning peak hour. The impact can be mitigated through signal timing adjustments to give the westbound through phase of M Street more green time. This measure slightly increases delay in the northbound and southbound approaches, but decreases delay overall such that the intersection is improved over background conditions. Other mitigations such as adding or changing the lane configurations were explored but not deemed feasible at this location due to right-of-way constraints. Adjusting signal timing decreases delay to levels that are improved over background conditions and thereby sufficiently mitigates new site trips.

4th & M Street SW Supplemental Analysis

The intersection of 4th Street & M Street was originally incorporated into the roadway network with a southbound left-turn lane in 2010. In 2012, the intersection was reconfigured such that left-turns were restricted.

As requested by DDOT, this CTR investigated the feasibility of restoring southbound left turns at the intersection at M Street and 4th Street SW (Intersection 12). The reintroduction of southbound left turns at this intersection is not meant to be considered a mitigation but rather provides a supplemental analysis scenario. Based on existing traffic counts taken in the study area, a modest percentage of vehicles were rerouted from I Street eastbound and 3rd Street southbound to utilize 4th Street southbound and turn left onto eastbound M Street. The reroute of traffic affected six (6) study intersections, as seen in Figure 24, with 27 vehicles and 52 vehicles rerouted in the morning and afternoon peak hours, respectively to use the southbound left turn lane at Intersection 12. Table 16 provides the results of the capacity analyses from the rerouted trips and Figure 25 shows the Total Future traffic volumes with reroutes.

As seen in the table, the addition of southbound left turns at 4th Street does not create a major source of delay at the approach when compared to the Total Future scenario, with overall delay increasing by fewer than two seconds in the afternoon peak period. The addition of southbound left turns, however does degrade delay in this approach from an LOS D to LOS E with a

13 second increase of delay. The rerouting of trips also relieves the southbound approach of M Street and 3rd Street SW, incidentally mitigating it from a LOS E to an LOS D in the afternoon peak hour—an improvement of over 20 seconds delay.

This report defers to DDOT in determining whether or not the left-turn movement should be reinstated at this location, based on the analysis included herein.

Table 10: Summary of Background Development Trip Generation

Background Development	ITE Land Use Code Trip Generation, 9th Ed.	Quantity		AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
The View at Waterfront	Based on approved TIS		**Total Trips**	**11**	**57**	**68**	**75**	**41**	**116**
Eliot on 4th	220 - Apartment	365	dwelling units	37	146	183	142	76	218
	820 - Shopping Center	8300	sf	21	13	34	54	59	113
			Total w/o Reduction	58	159	217	196	135	331
		Non-Auto Reduction:	65%	*-38*	*-103*	*-141*	*-127*	*-88*	*-215*
			Total Trips	**20**	**56**	**76**	**69**	**47**	**116**
1004 4th Street SW	220 - Apartment	443	dwelling units	44	177	221	170	91	261
	820 - Shopping Center	22500	sf	39	24	63	106	115	221
			Total w/o Reduction	83	201	284	276	206	482
		Non-Auto Reduction:	65%	*-54*	*-131*	*-185*	*-179*	*-134*	*-313*
			Total Trips	**29**	**70**	**99**	**97**	**72**	**169**
301 M Waterfront/Town Center	Based on approved TIS		**Total Trips**	**8**	**36**	**44**	**31**	**22**	**53**
St. Matthews	Based on approved TIS		**Total Trips**	**10**	**35**	**45**	**35**	**19**	**54**
680 Eye Street SW	Based on approved TIS		**Total Trips**	**42**	**69**	**111**	**70**	**54**	**124**
The Wharf Phase 1	Based on approved TIS		**Total Trips**	**415**	**193**	**608**	**320**	**470**	**790**
The Wharf Phase 2	Based on approved CTR scoping form		**Total Trips**	**384**	**122**	**506**	**196**	**408**	**602**
			Net Background Site Trips	**919**	**638**	**1,557**	**893**	**1,133**	**2,026**

Table 11: Applied Annual and Total Growth Rates

Road & Direction of Travel	Proposed Annual Growth Rate		Total Growth between 2017 and 2019	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
4th Street SW – Northbound	1.00%	1.00%	2.01%	2.01%
4th Street SW – Southbound	1.00%	1.00%	2.01%	2.01%
M Street SW - Eastbound	1.00%	0.10%	2.01%	0.20%
M Street SW - Westbound	0.10%	1.00%	0.20%	2.01%

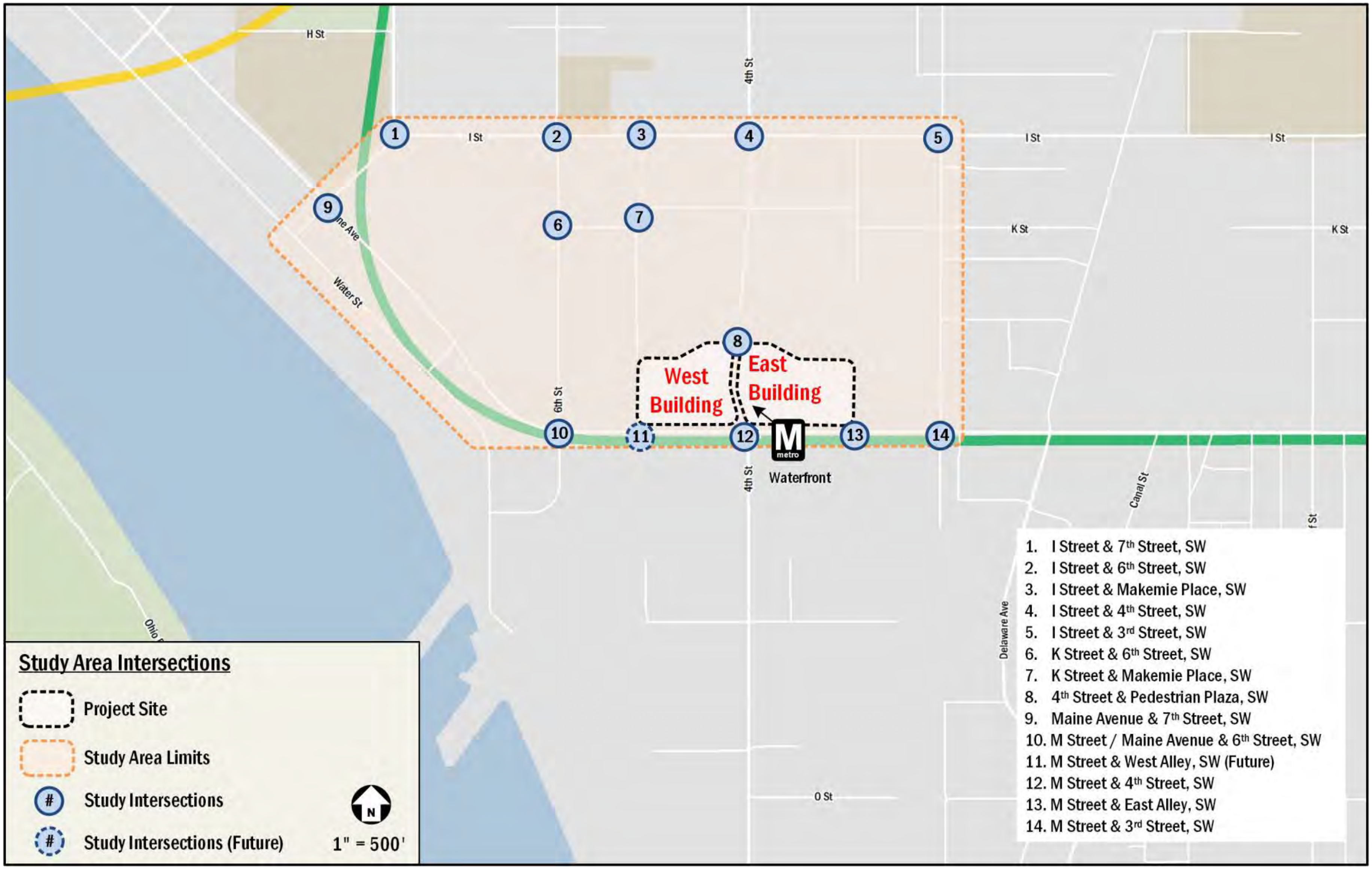

Figure 13: Study Area Intersections

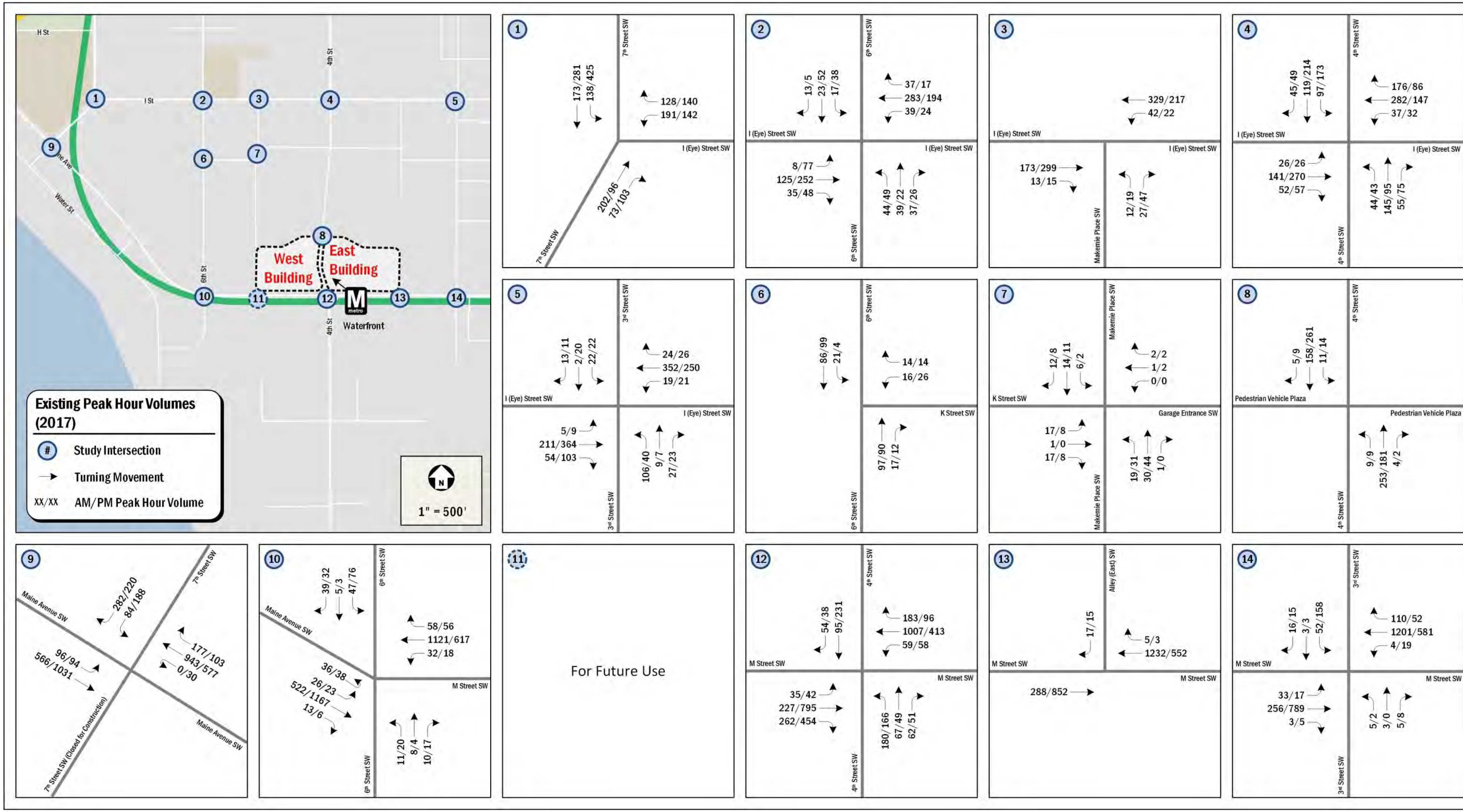

Figure 14: Existing Peak Hour Traffic Volumes (2017)

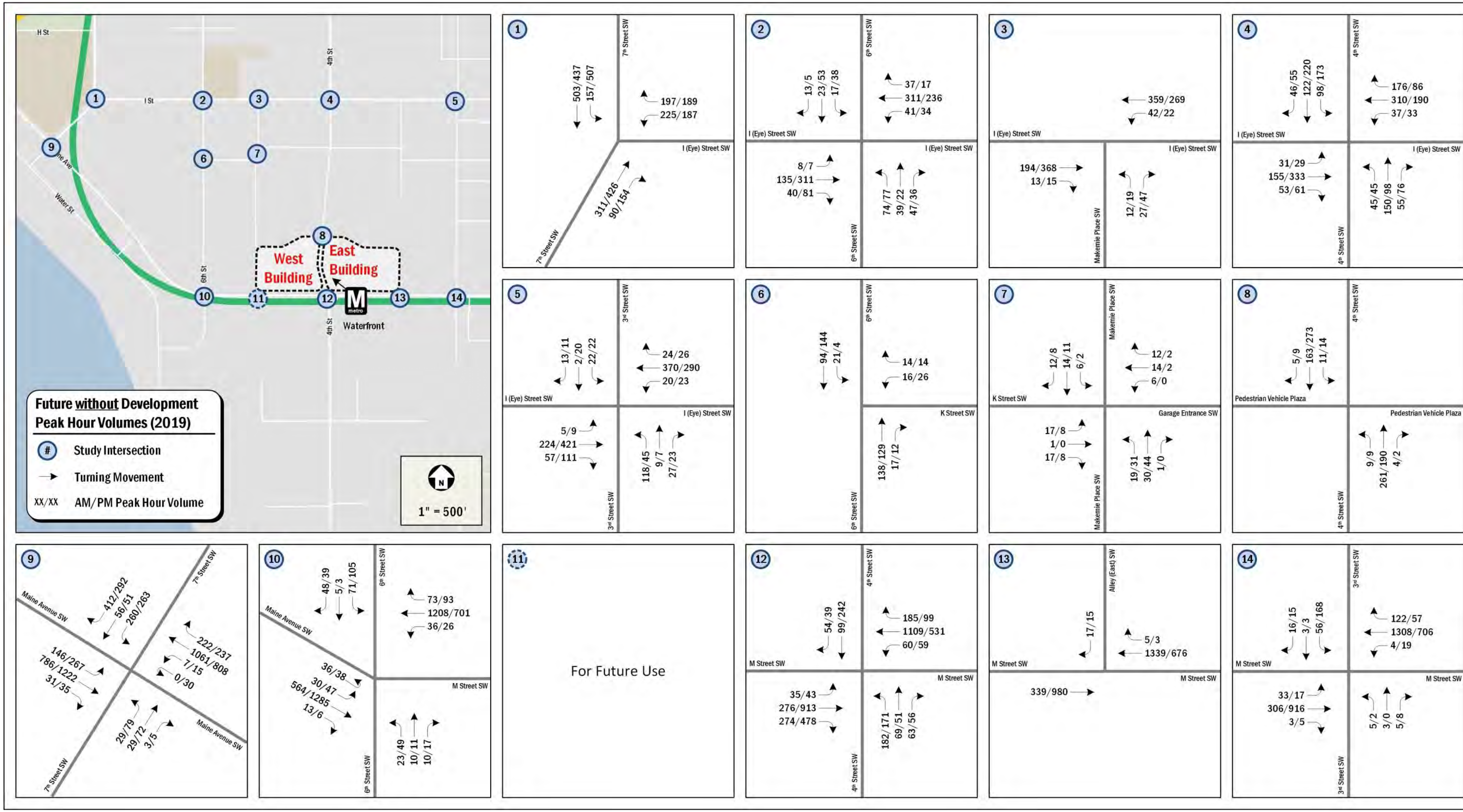

Figure 15: Background Peak Hour Traffic Volumes (2019)

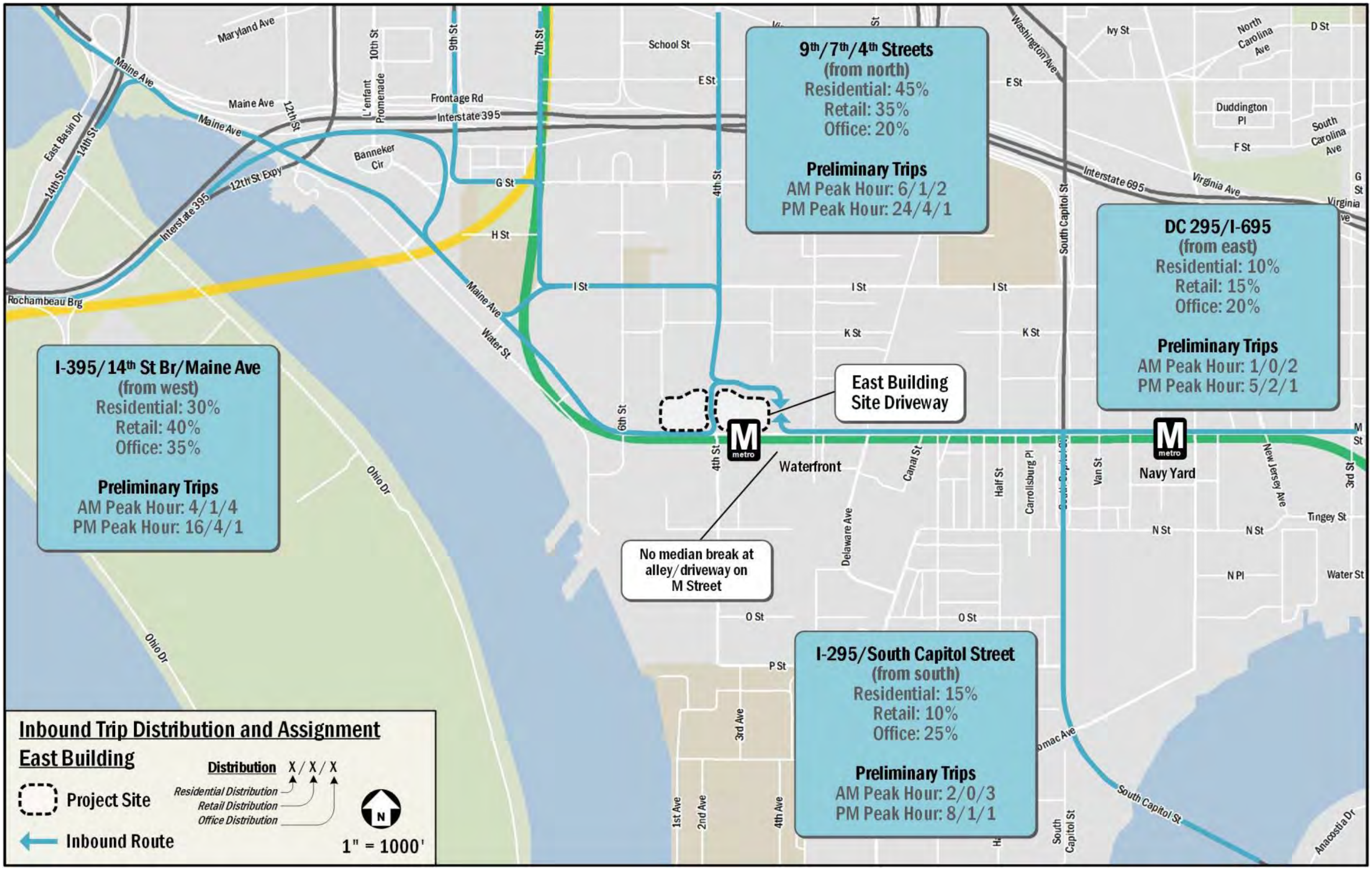

Figure 16: Inbound Trip Distribution and Routing – East Building

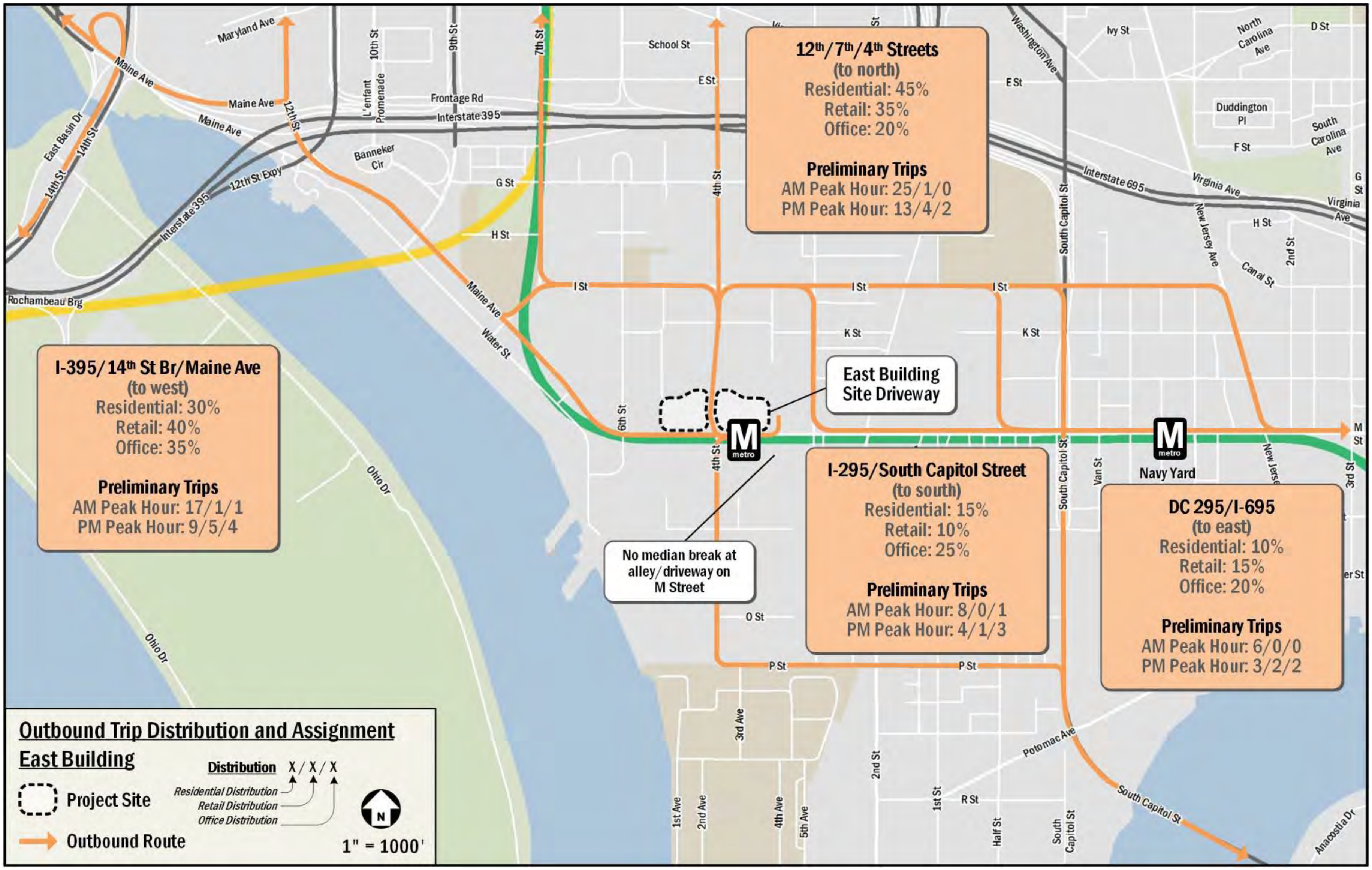

Figure 17: Outbound Trip Distribution and Routing – East Building

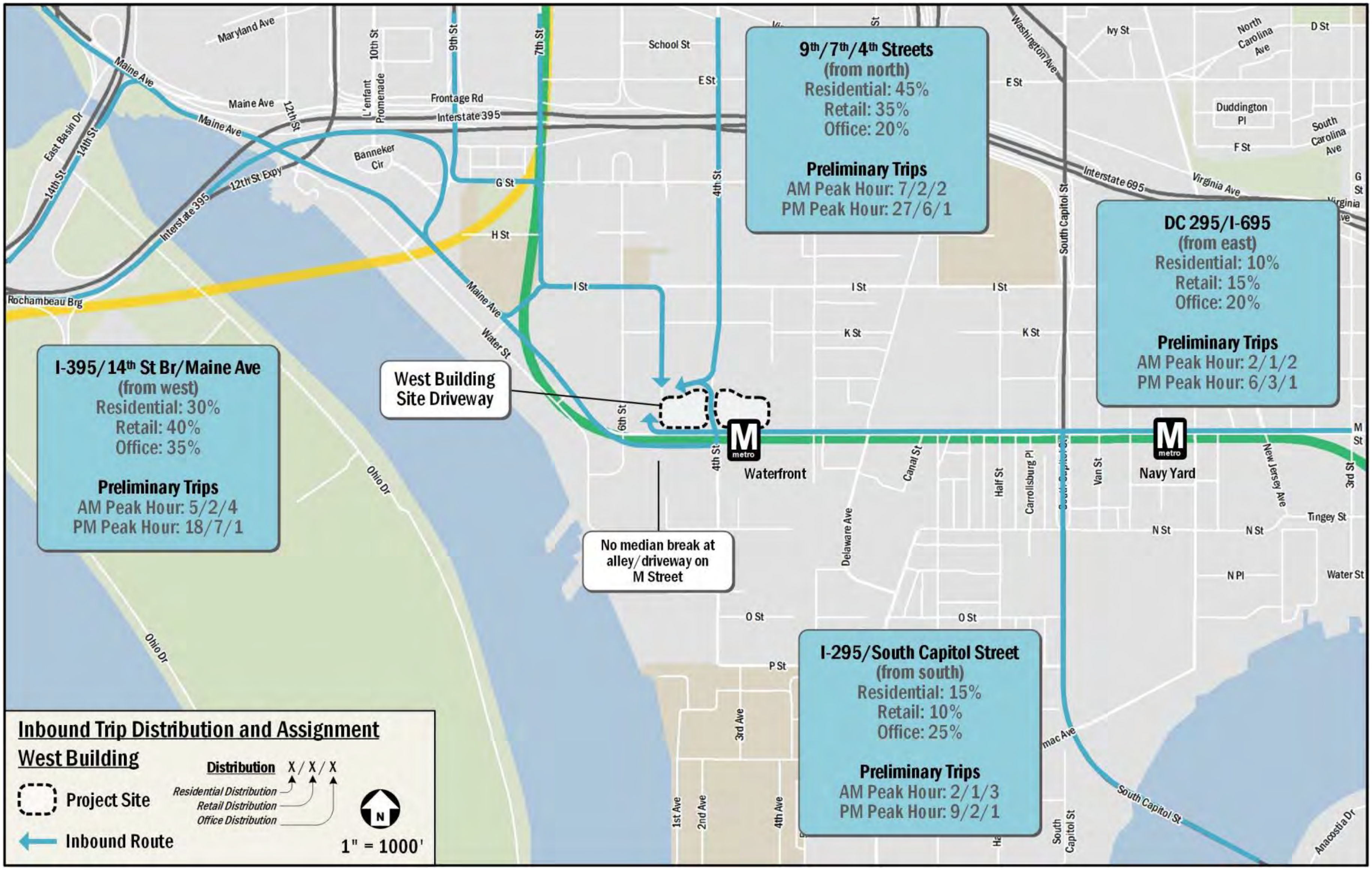

Figure 18: Inbound Trip Distribution and Routing – West Building

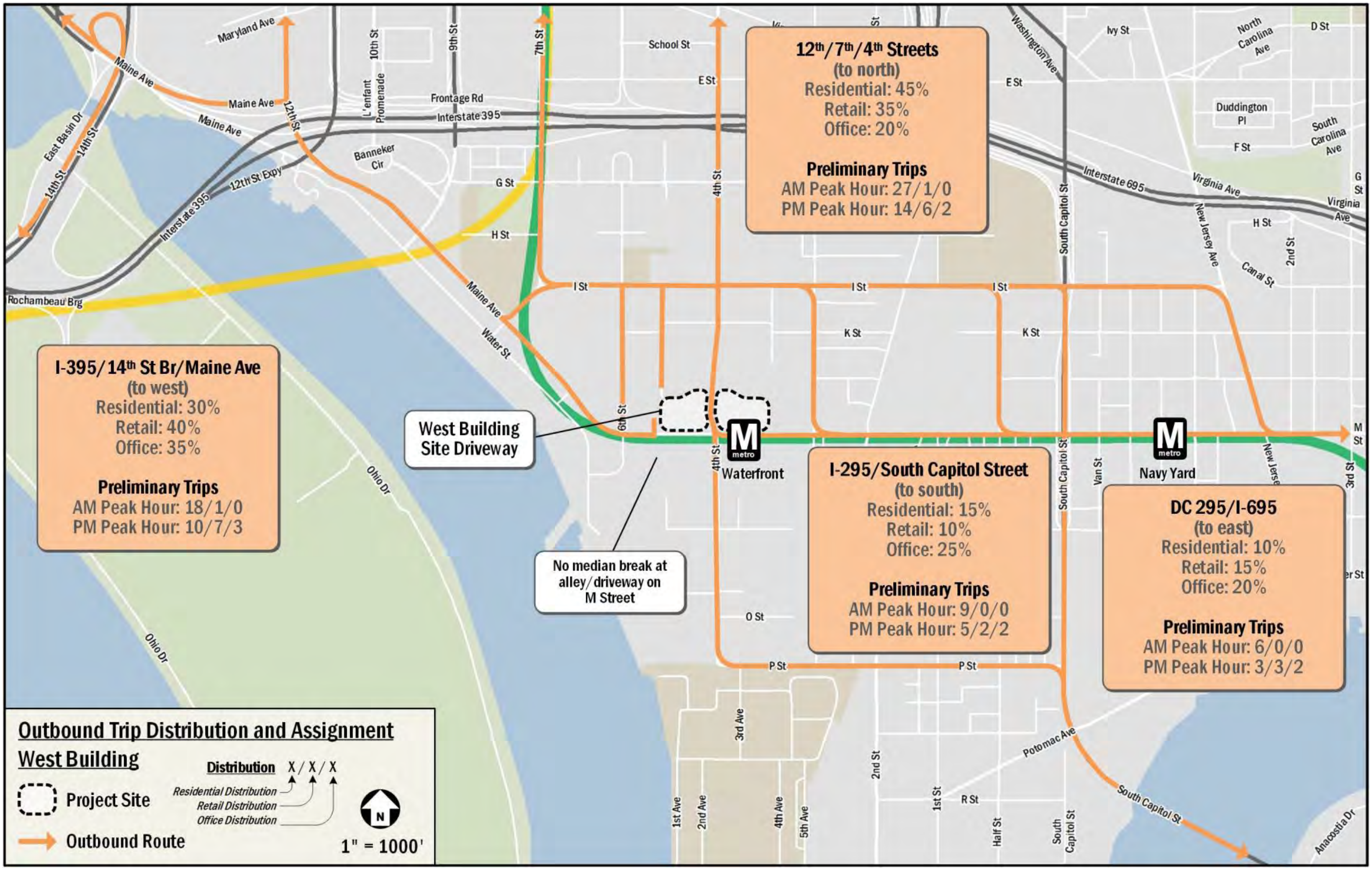

Figure 19: Outbound Trip Distribution and Routing – West Building

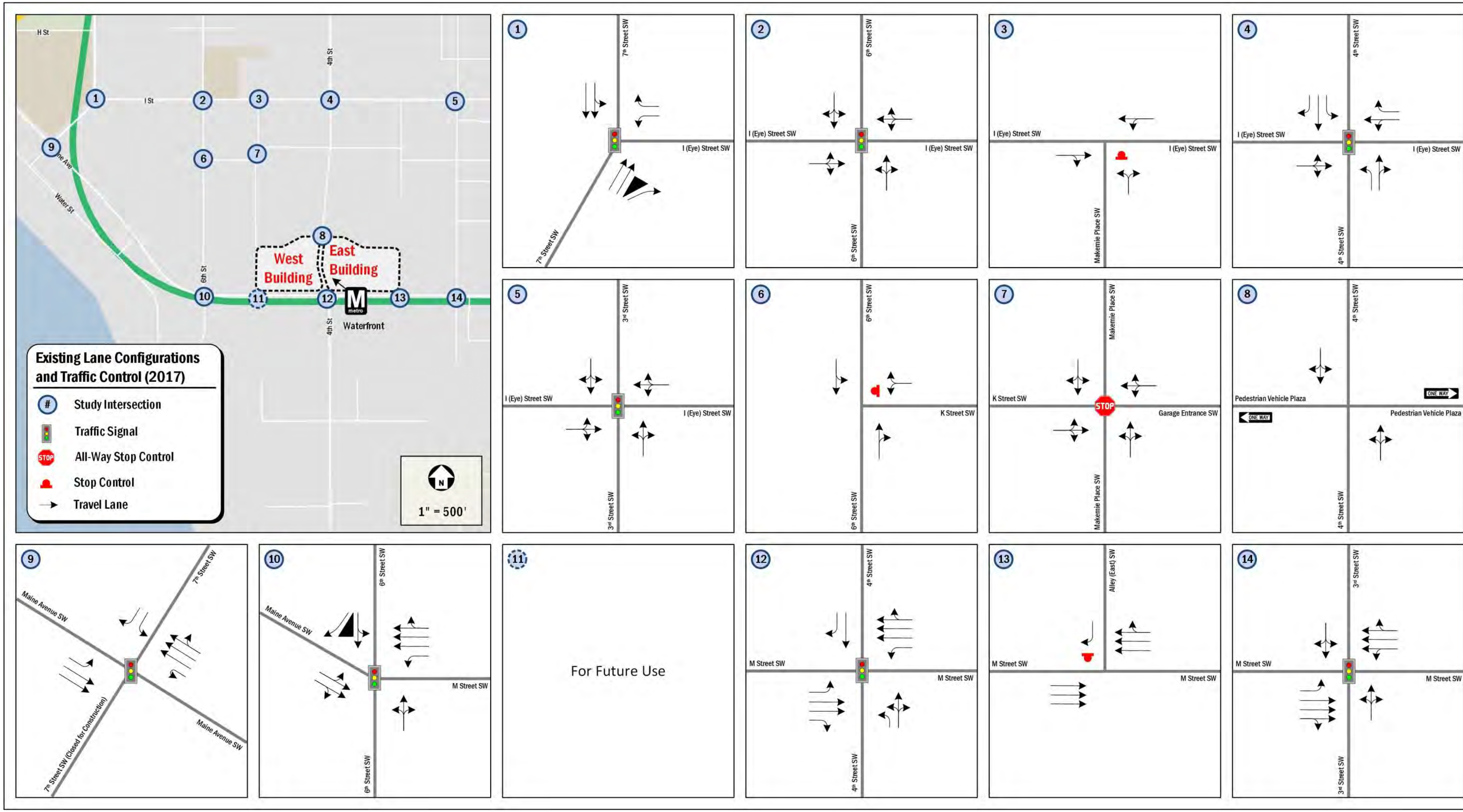

Figure 20: Existing Lane Configuration and Traffic Control (2017)

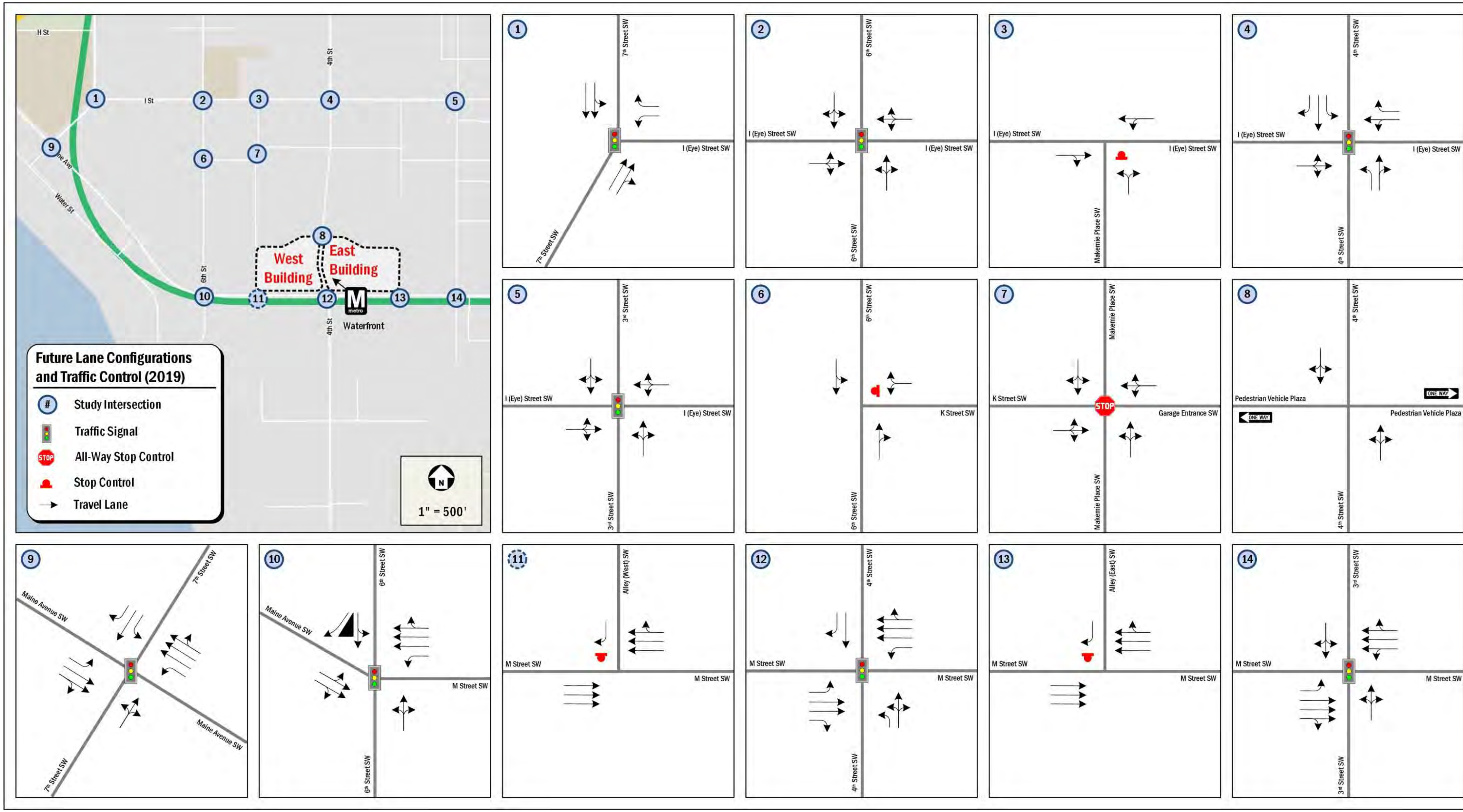

Figure 21: Background and Future Lane Configuration and Traffic Control (2019)

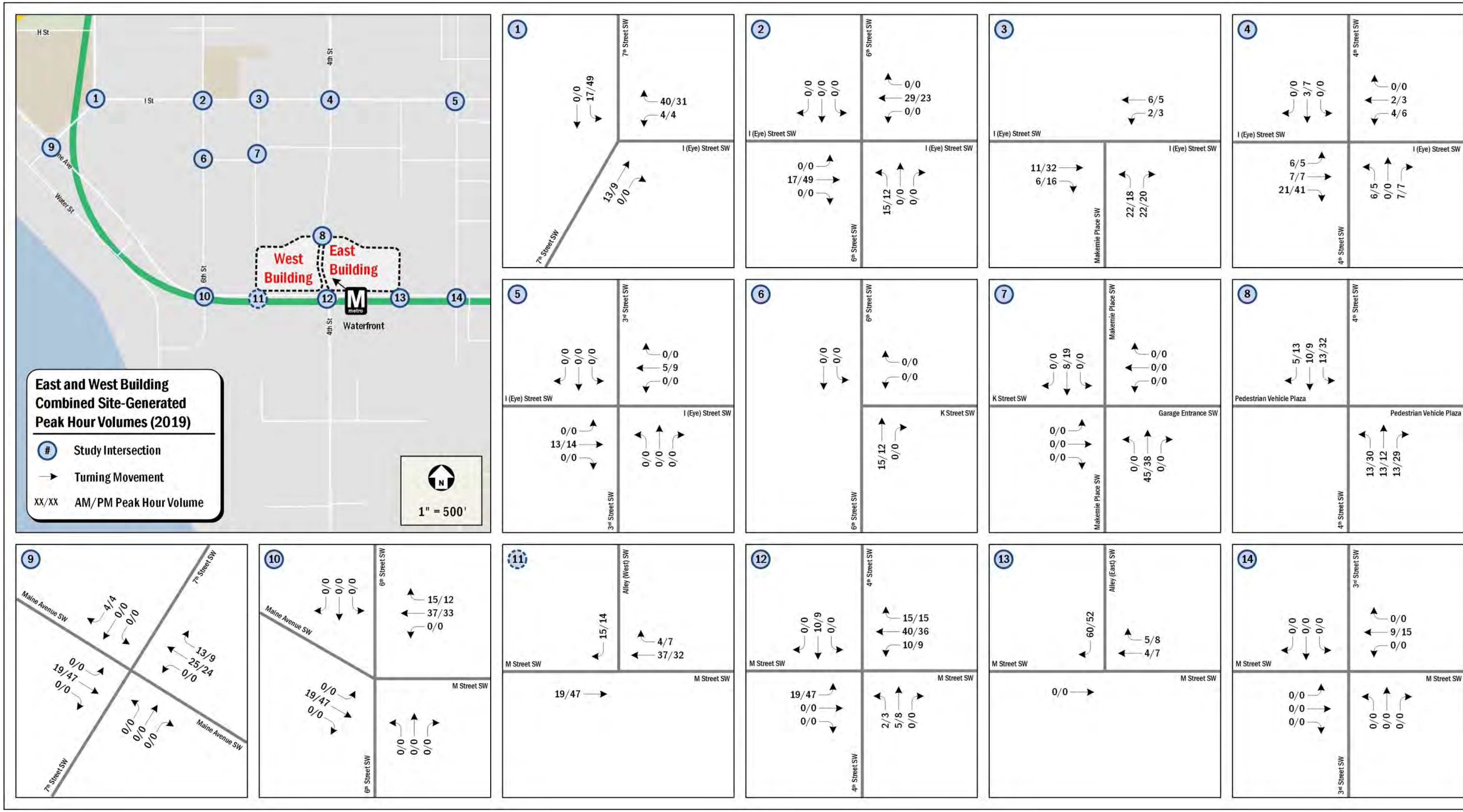

Figure 22: Site-Generated Peak Hour Traffic Volumes (2019)

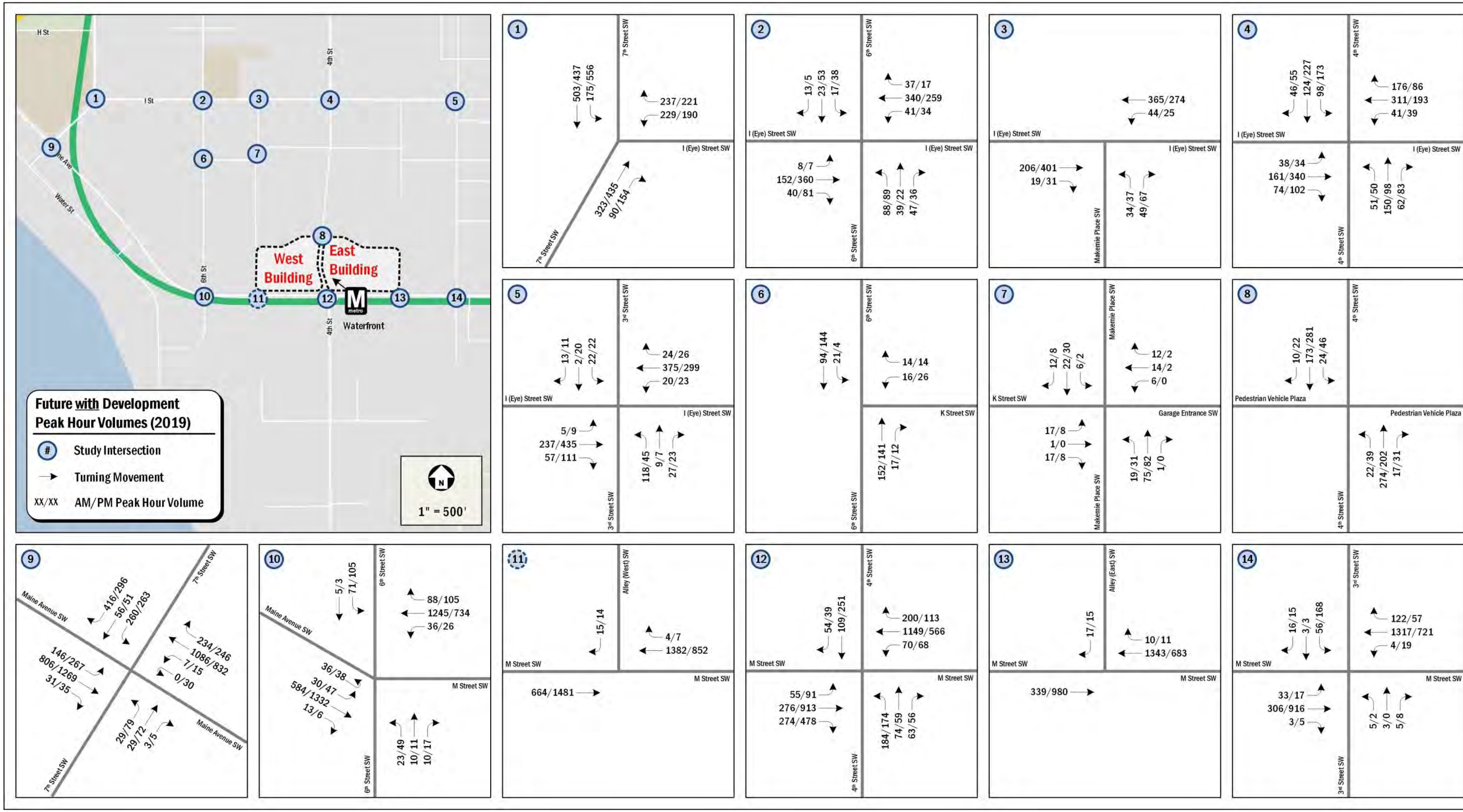

Figure 23: Future Peak Hour Traffic Volumes (2019)

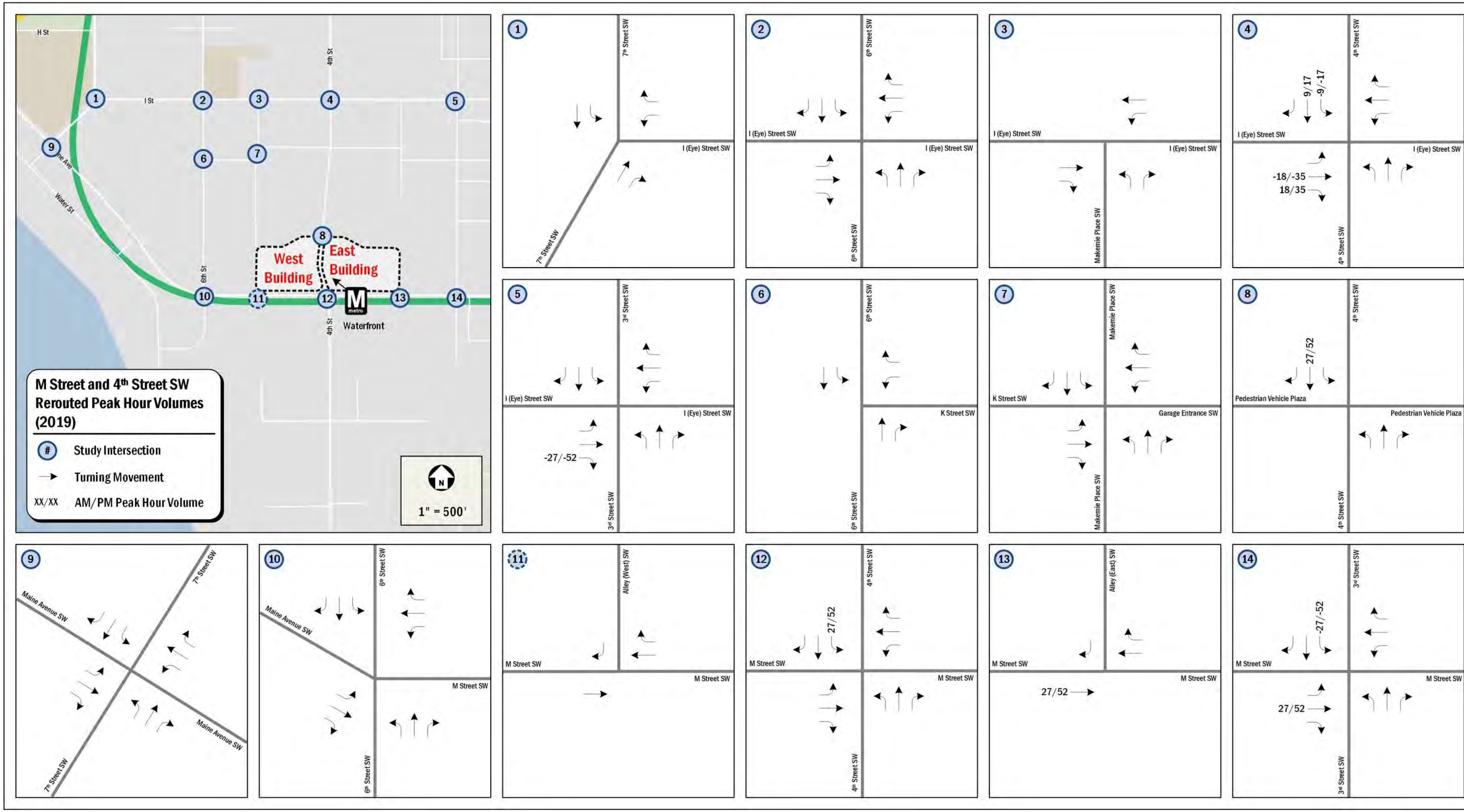

Figure 24: Rerouted Traffic Volumes at M Street and 4th Street SW

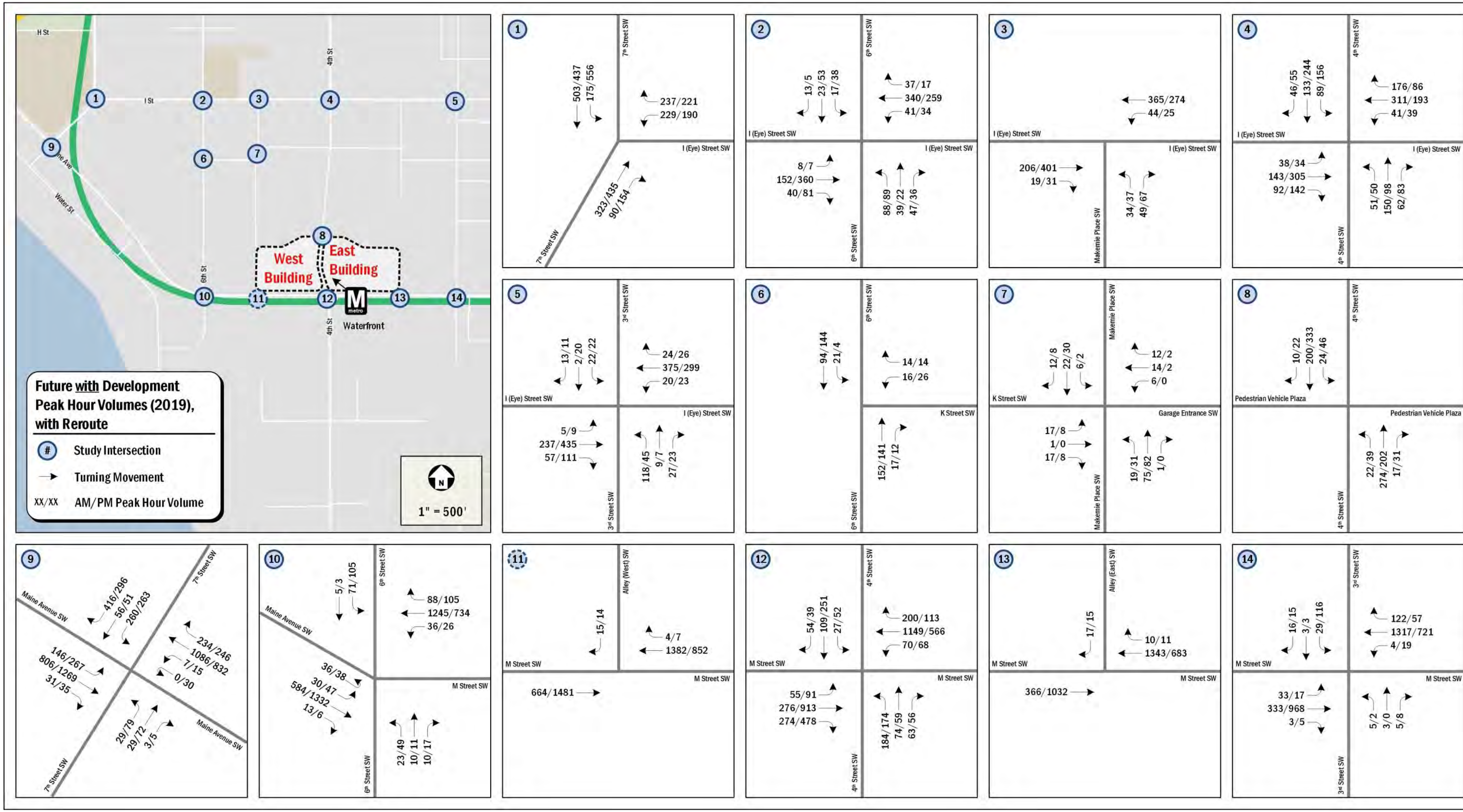

Figure 25: Future Peak Hour Rerouted Traffic Volumes (2019)

Table 12: LOS Results

	Intersection	Approach	Existing Conditions				Future without Development Conditions (2019)				Future with Development Conditions (2019)			
			AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	**I Street & 7th Street, SW**	**Overall**	**20.2**	**C**	**15.2**	**B**	**22.9**	**C**	**50.9**	**D**	**23.5**	**C**	**65.4**	**E**
		Westbound	27.6	C	18.2	B	28.5	C	20.4	C	28.7	C	19.5	B
		Northbound	16.4	B	8.6	A	18.0	B	11.7	B	17.9	B	11.7	B
		Southbound	15.9	B	15.8	B	22.1	C	87.2	F	23.1	C	116.3	F
2.	**I Street & 6th Street, SW**	**Overall**	**10.8**	**B**	**16.0**	**B**	**12.7**	**B**	**17.6**	**B**	**13.8**	**B**	**18.2**	**B**
		Eastbound	7.1	A	16.7	B	7.2	A	18.4	B	7.4	A	19.0	B
		Westbound	4.7	A	6.8	A	4.7	A	7.2	A	5.3	A	7.5	A
		Northbound	28.4	C	27.0	C	35.0	C	31.3	C	38.8	D	33.4	C
		Southbound	23.3	C	24.8	C	23.3	C	24.8	C	23.3	C	24.8	C
3.	**I Street & Makemie Place, SW**	**Overall**	**1.5**	**A**	**1.8**	**A**	**1.5**	**A**	**1.6**	**A**	**2.3**	**A**	**2.4**	**A**
		Eastbound	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
		Westbound	1.2	A	0.9	A	1.2	A	0.8	A	1.2	A	1.0	A
		Northbound	11.8	B	12.6	B	12.2	B	13.4	B	13.9	B	15.6	C
4.	**I Street & 4th Street, SW**	**Overall**	**18.3**	**B**	**24.2**	**C**	**18.6**	**B**	**24.1**	**C**	**19.0**	**B**	**25.2**	**C**
		Eastbound	13.3	B	5.9	A	13.4	B	8.4	A	15.2	B	11.2	B
		Westbound	18.1	B	10.4	B	18.8	B	11.5	B	19.0	B	11.9	B
		Northbound	21.3	C	27.2	C	21.5	C	27.4	C	21.7	C	28.0	C
		Southbound	20.5	C	46.9	D	20.6	C	47.0	D	20.7	C	48.9	D
5.	**I Street & 3rd Street, SW**	**Overall**	**13.5**	**B**	**12.6**	**B**	**14.0**	**B**	**12.2**	**B**	**13.9**	**B**	**12.2**	**B**
		Eastbound	8.8	A	12.8	B	9.3	A	12.0	B	9.0	A	12.1	B
		Westbound	12.5	B	6.8	A	12.9	B	7.2	A	13.0	B	7.3	A
		Northbound	23.9	C	26.0	C	24.8	C	26.4	C	24.8	C	26.4	C
		Southbound	18.5	B	24.7	C	18.5	B	24.7	C	18.5	B	24.7	C
6.	**K Street & 6th Street, SW**	**Overall**	**1.9**	**A**	**1.8**	**A**	**1.6**	**A**	**1.4**	**A**	**1.6**	**A**	**1.4**	**A**
		Westbound	10.2	B	10.2	B	10.6	B	10.8	B	10.7	B	10.9	B
		Northbound	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
		Southbound	1.6	A	0.3	A	1.5	A	0.2	A	1.6	A	0.3	A
7.	**K Street & Makemie Place, SW**	**Overall**	**7.3**	**A**	**7.4**	**A**	**7.5**	**A**	**7.4**	**A**	**7.7**	**A**	**7.6**	**A**
		Eastbound	7.3	A	7.1	A	7.4	A	7.1	A	7.5	A	7.2	A
		Westbound	7.0	A	6.9	A	7.5	A	6.9	A	7.7	A	7.1	A
		Northbound	7.4	A	7.5	A	7.6	A	7.5	A	7.9	A	7.8	A
		Southbound	7.1	A	7.0	A	7.3	A	7.0	A	7.5	A	7.3	A
8.	**4th Street & Pedestrian Plaza, SW**	**Overall**	**0.5**	**A**	**0.5**	**A**	**0.5**	**A**	**0.5**	**A**	**0.9**	**A**	**1.6**	**A**
		Northbound	0.4	A	0.5	A	0.4	A	0.5	A	0.7	A	1.7	A
		Southbound	0.6	A	0.5	A	0.6	A	0.5	A	1.2	A	1.6	A
9.	**Maine Avenue & 7th Street, SW**	**Overall**	**13.8**	**B**	**21.7**	**C**	**21.1**	**C**	**37.8**	**D**	**21.2**	**C**	**38.0**	**D**
		Eastbound	11.5	B	13.7	B	15.3	B	19.5	B	15.7	B	20.2	C
		Westbound	4.1	A	20.7	C	6.3	A	25.2	C	6.9	A	26.1	C
		Northbound	0.0	A	0.0	A	39.3	D	48.4	D	39.3	D	48.4	D
		Southbound	48.2	D	44.6	D	53.6	D	103.5	F	53.1	D	103.1	F
10.	**M Street/Maine Avenue & 6th Street, SW**	**Overall**	**8.4**	**A**	**21.8**	**C**	**10.0**	**A**	**24.2**	**C**	**10.3**	**B**	**25.3**	**C**
		Eastbound	10.3	B	28.3	C	13.4	B	32.4	C	14.2	B	34.7	C
		Westbound	5.8	A	8.9	A	5.9	A	8.5	A	6.2	A	8.3	A
		Northbound	35.1	D	36.2	D	35.9	D	38.9	D	35.9	D	38.9	D
		Southbound	21.8	C	29.4	C	25.2	C	33.2	C	25.2	C	33.2	C
11	**M Street & 425 M Street**	**Overall**									**0.1**	**A**	**0.1**	**A**
		Eastbound				***For Future Use***					0.0	A	0.0	A
		Westbound									0.0	A	0.0	A
		Southbound									9.7	A	8.8	A
12.	**M Street & 4th Street, SW**	**Overall**	**51.9**	**D**	**58.0**	**E**	**58.1**	**E**	**61.5**	**E**	**63.7**	**E**	**60.8**	**E**
		Eastbound	30.5	C	60.9	E	35.0	C	66.2	E	36.8	D	64.8	E
		Westbound	60.9	E	59.1	E	70.6	E	60.4	E	79.6	E	60.0	E
		Northbound	59.1	E	48.9	D	59.6	E	49.9	D	60.4	E	50.5	D

		Southbound	41.9	D	50.9	D	42.0	D	52.3	D	42.4	D	53.6	D
13.	**M Street & East Alley, SW**	**Overall**	**0.1**	**A**	**0.1**	**A**	**0.1**	**A**	**0.1**	**A**	**0.5**	**A**	**0.4**	**A**
		Eastbound	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
		Westbound	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A	0.0	A
		Southbound	9.6	A	10.2	B	9.8	A	9.9	A	10.3	B	10.3	B
14.	**M Street & 3rd Street, SW**	**Overall**	**19.0**	**B**	**18.1**	**B**	**19.6**	**B**	**18.8**	**B**	**19.6**	**B**	**18.9**	**B**
		Eastbound	2.7	A	7.7	A	2.8	A	8.2	A	2.8	A	8.2	A
		Westbound	21.4	C	17.3	B	22.5	C	18.1	B	22.5	C	18.2	B
		Northbound	36.1	D	35.8	D	36.1	D	35.8	D	36.1	D	35.8	D
		Southbound	41.9	D	66.6	E	42.6	D	73.0	E	42.6	D	73.0	E

Table 13: Queueing Results (in feet)

	Intersection	Lane Group	Storage Length (ft)	Existing Conditions				Future without Development Conditions (2019)				Future with Development Conditions (2019)			
				AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
				50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %
1.	**I Street & 7th Street, SW**	Westbound Left	462	122	181	52	83	147	212	73	113	150	216	74	114
		Westbound Right	141	0	40	0	20	0	46	4	29	0	50	7	31
		Northbound Thru	250	76	111	13	23	128	154	79	106	132	159	81	109
		Northbound Right	250	4	15	0	18	--	--	--	--	--	--	--	--
		Southbound Thru	630	78	103	138	181	214	257	~320	#401	225	271	~352	#433
2.	**I Street & 6th Street, SW**	Eastbound LTR	460	37	61	147	236	41	67	225	m228	45	73	254	m242
		Westbound LTR	245	40	56	42	83	42	58	53	92	51	69	61	101
		Northbound LTR	225	56	101	44	84	78	135	64	115	87	#164	71	125
		Southbound LTR	275	23	50	39	80	23	50	40	81	23	50	40	81
3.	**I Street & Makemie Place, SW**	Eastbound TR	215	--	0	--	0	--	0	--	0	--	0	--	0
		Westbound LT	300	--	3	--	2	--	3	--	2	--	3	--	2
		Northbound LR	220	--	7	--	12	--	7	--	13	--	18	--	26
4.	**I Street & 4th Street, SW**	Eastbound LTR	288	54	95	49	80	61	99	40	142	76	119	67	175
		Westbound LT	566	133	223	47	72	150	245	60	94	153	251	62	100
		Westbound Right	370	71	135	22	41	72	136	22	46	72	137	22	47
		Northbound Left	110	16	41	18	46	16	42	19	48	19	46	21	52
		Northbound TR	140	69	128	55	115	72	132	56	117	74	1136	58	121
		Southbound Left	165	37	79	85	#205	37	80	85	#206	37	81	86	#208
		Southbound Thru	625	43	83	91	156	44	84	94	160	45	86	97	165
		Southbound Right	122	0	4	0	7	0	4	0	11	0	4	0	11
5.	**I Street & 3rd Street, SW**	Eastbound LTR	570	57	95	119	m154	69	107	121	m155	72	109	138	m214
		Westbound LTR	540	122	179	57	95	131	191	67	110	133	194	70	114
		Northbound LTR	237	55	103	21	53	62	112	23	57	62	112	23	57
		Southbound LTR	193	9	29	17	46	9	29	17	46	9	29	17	46
6.	**K Street & 6th Street, SW**	Westbound LR	210	--	4	--	5	--	4	--	6	--	4	--	6
		Northbound TR	593	--	0	--	0	--	0	--	0	--	0	--	0
		Southbound LT	230	--	1	--	0	--	1	--	0	--	1	--	0
7.	**K Street & Makemie Place, SW**	Eastbound LTR	200	*HCM does not analyze all-way stop intersections for queueing*											
		Westbound LTR	323												
		Northbound LTR	633												
		Southbound LTR	235												
8.	**4th Street & Pedestrian Plaza, SW**	Northbound LTR	147	--	1	--	1	--	1	--	1	--	2	--	4
		Southbound LTR	315	--	1	--	1	--	1	--	1	--	2	--	4
9.	**Maine Avenue & 7th Street, SW**	Eastbound Left	230	27	m57	30	m43	58	m88	104	m134	59	m89	106	m141
		Eastbound TR	740	132	163	303	m305	194	232	366	m385	200	238	381	m401
		Westbound LTR	1000	23	26	198	228	--	--	--	--	--	--	--	--
		Westbound Left	230	--	--	--	--	1	m2	37	m#102	1	m2	35	m#106
		Westbound TR	227	--	--	--	--	52	59	284	312	58	67	293	322
		Northbound LTR	228	--	--	--	--	41	83	127	191	41	83	127	191
		Southbound Left	228	66	121	146	#261	219	#397	~272	#446	219	#398	~272	#446
		Southbound Thru	228	--	--	--	--	41	m63	34	70	40	m59	34	70
		Southbound Right	228	--	--	--	--	257	227	130	213	246	232	132	217
		Southbound TR	228	172	190	78	144	--	--	--	--	--	--	--	--
10.	**M Street/Maine Avenue & 6th Street, SW**	Eastbound LTR	1000	119	149	481	572	126	m170	597	m670	134	m182	640	m713
		Westbound Left	210	5	m6	5	m12	5	m63	6	m46	5	m59	6	m44
		Westbound TR	540	61	m74	67	75	62	m63	68	76	65	m66	71	78
		Northbound LTR	370	13	39	16	48	22	55	45	92	22	55	45	92
		Southbound LT	590	37	74	60	105	56	103	86	141	56	103	86	141
		Southbound Right	266	0	0	0	0	0	0	0	0	0	0	0	0
11.	**M Street & 425 M Street, SW**	Eastbound Thru	306	--	--	--	--	--	--	--	--	--	0	--	0
		Westbound TR	215			--	--	--	--	--	--	--	0	--	0

		Southbound Right	100	--	--	--	--	--	--	--	--	--	2	--	1
12.	**M Street & 4th Street, SW**	Eastbound Left	195	16	35	23	m38	16	37	26	m34	26	54	57	m69
		Eastbound Thru	545	87	126	321	#392	110	148	380	#533	111	150	381	m#517
		Eastbound Right	300	96	207	319	438	106	234	342	m434	110	242	346	m415
		Westbound Left	220	21	m45	49	m95	24	m46	51	m97	29	m54	56	m103
		Westbound TR	565	284	#345	158	m200	318	#463	199	m242	~340	#500	212	m257
		Northbound Left	420	142	211	107	176	143	214	113	188	147	217	117	192
		Northbound LTR	545	138	209	107	180	142	212	111	186	145	216	117	195
		Southbound Thru	668	71	122	180	273	73	126	190	285	81	138	199	297
		Southbound Right	130	40	79	26	59	40	79	27	60	40	79	27	60
13.	**M Street & East Alley/375 M Street, SW**	Westbound TR	230	--	0	--	0	--	0	--	0	--	0	--	0
		Southbound Right	100	--	2	--	2	--	2	--	2	--	10	--	9
14.	**M Street & 3rd Street, SW**	Eastbound Left	165	5	m14	3	m3	4	m19	3	m3	4	m19	3	m3
		Eastbound TR	575	14	13	140	136	15	13	154	m160	15	13	154	m159
		Westbound LTR	278	254	301	107	135	289	339	134	167	292	343	138	170
		Northbound LTR	365	6	24	0	0	6	24	0	0	6	24	0	0
		Southbound LTR	605	47	91	151	#252	51	96	162	#277	51	96	162	#277

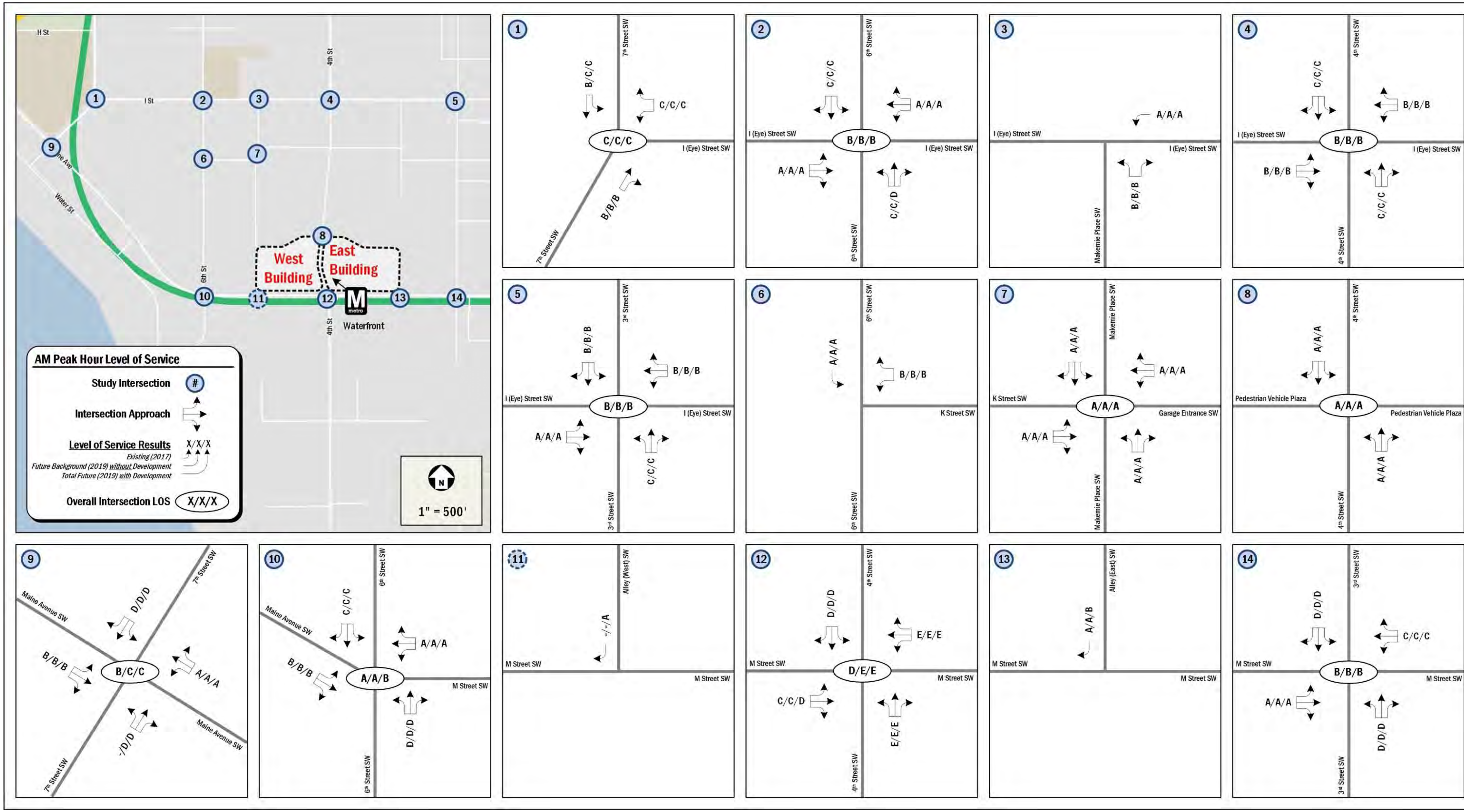

Figure 26: Morning Peak Hour Capacity Analysis Results

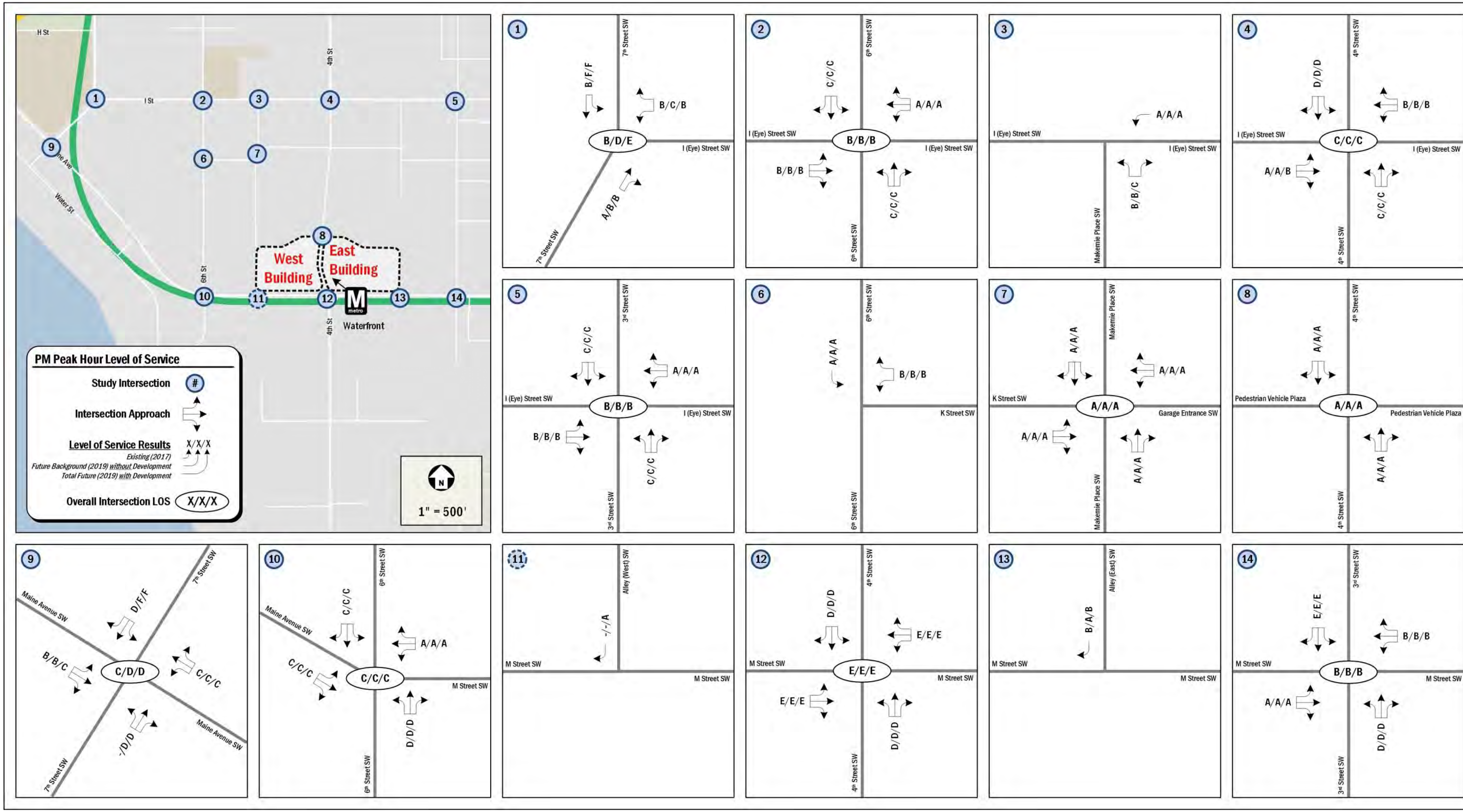

Figure 27: Afternoon Peak Hour Capacity Analysis Results

Table 14: Vehicular Capacity Analysis Results with Mitigations

	Intersection	Approach	Existing Conditions				Future with Development Conditions (2019)				Future with Development Conditions (2019) (With Mitigations			
			AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1.	I Street & 7th Street, SW	**Overall**	--	--	**15.2**	**B**	--	--	**65.4**	**E**	--	--	**24.1**	**C**
		Westbound	--	--	18.2	B	--	--	19.5	B	--	--	47.2	D
		Northbound	--	--	8.6	A	--	--	11.7	B	--	--	10.2	B
		Southbound	--	--	15.8	B	--	--	116.3	F	--	--	22.9	C
12.	M Street & 4th Street, SW	**Overall**	**51.9**	**D**	--	--	**63.7**	**E**	--	--	**56.3**	**E**	--	--
		Eastbound	30.5	C	--	--	36.8	D	--	--	34.2	C	--	--
		Westbound	60.9	E	--	--	79.6	E	--	--	66.8	E	--	--
		Northbound	59.1	E	--	--	60.4	E	--	--	62.1	E	--	--
		Southbound	41.9	D	--	--	42.4	D	--	--	42.9	D	--	--

Table 15: Queueing Results (in feet) (with Mitigations)

	Intersection	Lane Group	Storage Length (ft)	Existing Conditions				Future with Development Conditions (2019)				Future with Development Conditions (2019) (With Mitigations)			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %	50th %	95th %
1.	I Street & 7th Street, SW	Westbound Left	462	--	--	52	83	--	--	74	114	--	--	162	234
		Westbound Right	141	--	--	0	20	--	--	7	31	--	--	0	55
		Northbound Thru	250	--	--	13	23	--	--	81	109	--	--	97	112
		Northbound Right	250	--	--	0	18	--	--	--	--	--	--	--	--
		Southbound Thru	630	--	--	138	181	--	--	~352	#433	--	--	336	410
12.	M Street & 4th Street, SW	Eastbound Left	195	16	35	--	--	26	54	--	--	26	53	--	--
		Eastbound Thru	545	87	126	--	--	111	150	--	--	106	144	--	--
		Eastbound Right	300	96	207	--	--	110	242	--	--	101	229	--	--
		Westbound Left	220	21	m45	--	--	29	m54	--	--	27	m52	--	--
		Westbound TR	565	284	#345	--	--	~340	#500	--	--	319	#482	--	--
		Northbound Left	420	142	211	--	--	147	217	--	--	147	218	--	--
		Northbound LTR	545	138	209	--	--	145	216	--	--	146	#222	--	--
		Southbound Thru	668	71	122	--	--	81	138	--	--	82	139	--	--
		Southbound Right	130	40	79	--	--	40	79	--	--	40	80	--	--

Table 16: Vehicular Capacity Analysis Results with Rerouting of Southbound Left Turns

	Intersection	Approach	Future with Development Conditions (2019)				Future with Development, Reroute of 4th and M SBL Trips			
			AM Peak Hour		*PM Peak Hour*		*AM Peak Hour*		*PM Peak Hour*	
			Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
4.	**I Street & 4th Street, SW**	**Overall**	**19.0**	**B**	**25.2**	**C**	**19.0**	**B**	**22.8**	**C**
		Eastbound	15.2	B	11.2	B	15.3	B	11.3	B
		Westbound	19.0	B	11.9	B	19.0	B	11.9	B
		Northbound	21.7	C	28.0	C	21.7	C	28.2	C
		Southbound	20.7	C	48.9	D	20.4	C	40.6	D
5.	**I Street & 3rd Street, SW**	**Overall**	**13.9**	**B**	**12.2**	**B**	**13.8**	**B**	**12.0**	**B**
		Eastbound	9.0	A	12.1	B	8.3	A	11.7	B
		Westbound	13.0	B	7.3	A	12.9	B	7.3	A
		Northbound	24.8	C	26.4	C	24.8	C	26.4	C
		Southbound	18.5	B	24.7	C	18.5	B	24.7	C
8.	**4th Street & Pedestrian Plaza, SW**	**Overall**	**0.9**	**A**	**1.6**	**A**	**0.9**	**A**	**1.6**	**A**
		Northbound	0.7	A	1.7	A	0.8	A	1.7	A
		Southbound	1.2	A	1.6	A	1.1	A	1.5	A
10.	**M Street/Maine Avenue & 6th Street, SW**	**Overall**	**10.3**	**B**	**25.3**	**C**	**10.3**	**B**	**25.3**	**C**
		Eastbound	14.2	B	34.7	C	14.2	B	34.7	C
		Westbound	6.2	A	8.3	A	6.2	A	8.3	A
		Northbound	35.9	D	38.9	D	35.9	D	38.9	D
		Southbound	25.2	C	33.2	C	25.2	C	33.2	C
12.	**M Street & 4th Street, SW**	**Overall**	**63.7**	**E**	**60.8**	**E**	**63.8**	**E**	**62.3**	**E**
		Eastbound	36.8	D	64.8	E	36.8	D	64.8	E
		Westbound	79.6	E	60.0	E	79.7	E	60.0	E
		Northbound	60.4	E	50.5	D	60.4	E	50.5	D
		Southbound	42.4	D	53.6	D	45.8	D	66.8	E
13.	**M Street & East Alley, SW**	**Overall**	**0.5**	**A**	**0.4**	**A**	**0.5**	**A**	**0.4**	**A**
		Eastbound	0.0	A	0.0	A	0.0	A	0.0	A
		Westbound	0.0	A	0.0	A	0.0	A	0.0	A
		Southbound	10.3	B	10.3	B	10.3	B	10.3	B
14.	**M Street & 3rd Street, SW**	**Overall**	**19.6**	**B**	**18.9**	**B**	**19.4**	**B**	**15.2**	**B**
		Eastbound	2.8	A	8.2	A	**5.0**	**A**	**7.8**	**A**
		Westbound	22.5	C	18.2	B	22.5	C	18.2	B
		Northbound	36.1	D	35.8	D	36.1	D	35.8	D
		Southbound	42.6	D	73.0	E	38.4	D	51.3	D

TRANSIT

This section discusses the existing and proposed transit facilities in the vicinity of the site, accessibility to transit, and evaluates the overall transit impacts of the M Street Sites.

The following conclusions are reached within this chapter:

- The M Street Sites have adequate access to transit
- The M Street Sites are located adjacent to the Waterfront Metrorail Station
- The M Street Sites are surrounded by four (4) Metrobus routes, and additional regional commuter buses, that provide connectivity to the downtown core and other areas of the District, Maryland, and Virginia.
- The M Street Sites are expected to generate a manageable number of transit trips, and the existing service is capable of handling these new trips.

EXISTING TRANSIT SERVICE

The M Street Sites are well served by Metrorail, Metrobus, and several regional commuter buses. Combined, these transit services provide local, city-wide, and regional transit connections that link the sites with major cultural, residential, employment, and commercial destinations throughout the region. Figure 28 identifies the major transit routes, stations, and stops surrounding the M Street Sites.

The sites are located adjacent to the Waterfront Metrorail Station, located at the intersection of 4th Street and M Street SW, and is served by the Green Line, providing direct connections to areas in the District, Maryland, and Virginia.

The Green Line connects the sites to Greenbelt, MD to the north, extending through downtown Washington via Gallery Place-Chinatown and L'Enfant Plaza, before ending in Suitland, MD (Branch Avenue) to the south. Metrorail trains run frequently during the weekday morning and afternoon peak

Table 17: Metrobus and Regional Commuter Bus Route Information

Route Number	Route Name	Service Hours	Headway	Walking Distance to Nearest Bus Stop
74	Convention Center-Southwest Waterfront Line	Weekdays: 4:59 AM-12:00 AM Weekend: 5:02 AM-12:08 AM	12-26 min	<0.1 miles, 1 minute
A9	Martin Luther King Jr. Avenue Limited Line	Weekdays: Northbound 6:25 AM-9:28 AM Southbound 3:52 PM-7:11 PM	10-21 min	<0.1 miles, 1 minute
P6	Anacostia-Eckington Line	Weekdays: 4:19 AM-3:36 AM Weekend: 4:17 AM-2:58 AM	6-45 min	0.1 miles, 3 minutes
V1	Benning Heights-M Street Line	Weekdays: Eastbound 3:08 PM-7:09 PM Westbound 5:30 AM-9:20 AM	16-29 min	0.1 miles, 3 minutes
735	Charlotte Hall/Waldorf to Washington, D.C. MTA Line	Weekdays: Northbound 12:31 PM-5:41 PM Southbound 5:48 AM-8:40 AM	15-30 min	<0.1 miles, 1 minute
850	Prince Frederick/Dunkirk to Suitland/Washington, D.C. MTA Line	Weekdays: Northbound 5:54 AM-8:06 AM Southbound 3:16 PM-5:16 PM	30-31 min	<0.1 miles, 1 minute
PRTC D-300	Dale City-Washington Navy Yard Omni-Ride Line	Weekdays: Eastbound 5:52 AM-8:15 AM Westbound 12:22 PM-7:46 PM	16-102 min	0.1 miles, 2 minutes
LCT	Loudoun County Transit	Weekdays: Eastbound 6:19 AM-7:48 AM Westbound 3:39 PM-5:04 PM	1-38 min	<0.1 miles, 1 minute

hours between 5:00 AM to 9:30 AM and 3:00 PM to 7:00 PM and approximately every 8 to 15 minutes during the weekday midday hours from 9:30 AM to 3:00 PM and every 8 to 20 minutes during the weekday off-peak periods and on weekends.

The M Street Sites are also serviced by local Metrobus routes and additional regional bus service, providing connectivity to the downtown core and other areas of the District, Maryland, and Virginia. Table 17 shows a summary of the bus route information for the routes within a quarter-mile walkshed of the sites, including service hours, headway, and distance to the nearest bus stop.

Figure 28 shows a detailed inventory of the existing Metrobus stops within a quarter-mile walkshed of the sites. Each stop is evaluated based on the guidelines set forth by WMATA's *Guidelines for the Design and Placement of Transit Stops*. A detailed breakdown of individual bus stop amenities and conditions is included in the Technical Appendix.

Proposed Transit Service

MoveDC

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 to further 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 transportations system, specifically in a way that expands 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
- Water taxis

Outlined in the MoveDC plan, the North-South Corridor Streetcar line is proposed in the vicinity of the sites, connecting Buzzard Point and Takoma/Silver Spring, MD. Proposed routing near the site is along 7^{th} Street, Maine Avenue, and M Street.

WMATA and DDOT Transit Studies

WMATA studied capacity of Metrorail stations in its *Station Access & Capacity Study (2008)*. The study analyzed the capacity of Metrorail stations for their vertical transportation, for example the capacity of the station at elevators, stairs, and escalators to shuttle patrons between the street, mezzanine, and platforms. The study also analyzed stations' capacity to process riders at fare card gates. For both analyses, vertical transportation and fare card gates, volume-to-capacity ratios were calculated for existing data (from 2005) and projections for the year 2030. According to the study, the Waterfront station can currently accommodate future growth at all access points.

WMATA has also studied capacity along Metrobus routes. DC's *Transit Future System Plan (2010)* lists the bus routes with the highest load factor (a ratio of passenger volume to bus capacity). A load factor is considered unacceptable if it is over 1.2 during peak periods or over 1.0 during off-peak or weekend periods. According to this study, Metrobus routes that travel near the sites operate at a load factor that is at or below its capacity during peak periods of the day. As it is expected that the majority of new trips will be made via the Metrorail, site-generated transit trips will not cause detrimental impacts to Metrobus or Metrorail service.

Site-generated transit Impacts

The East M Street Site is projected to generate 89 transit trips (33 inbound, 56 outbound) during the morning peak hour, and 138 transit trips (75 inbound, 63 outbound) during the afternoon peak hour.

The West M Street Site is projected to generate 86 transit trips (32 inbound, 54 outbound) during the morning peak hour, and 132 transit trips (71 inbound, 61 outbound) during the afternoon peak hour.

US Census data was used to determine the distribution of those taking Metrorail and those taking Metrobus. The sites lies in

TAZ 20384 and data shows that approximately 70 percent of transit riders used Metrorail and the remainder use Metrobus. That said, collectively, approximately 123 people will use Metrorail and 52 people will use Metrobus during the morning peak hour; approximately 189 people will use Metrorail and 81 people will use Metrobus during the afternoon peak hour.

Given the existing capacity of the surrounding transit facilities, site-generated transit trips will not cause detrimental impacts to Metrobus or Metrorail service.

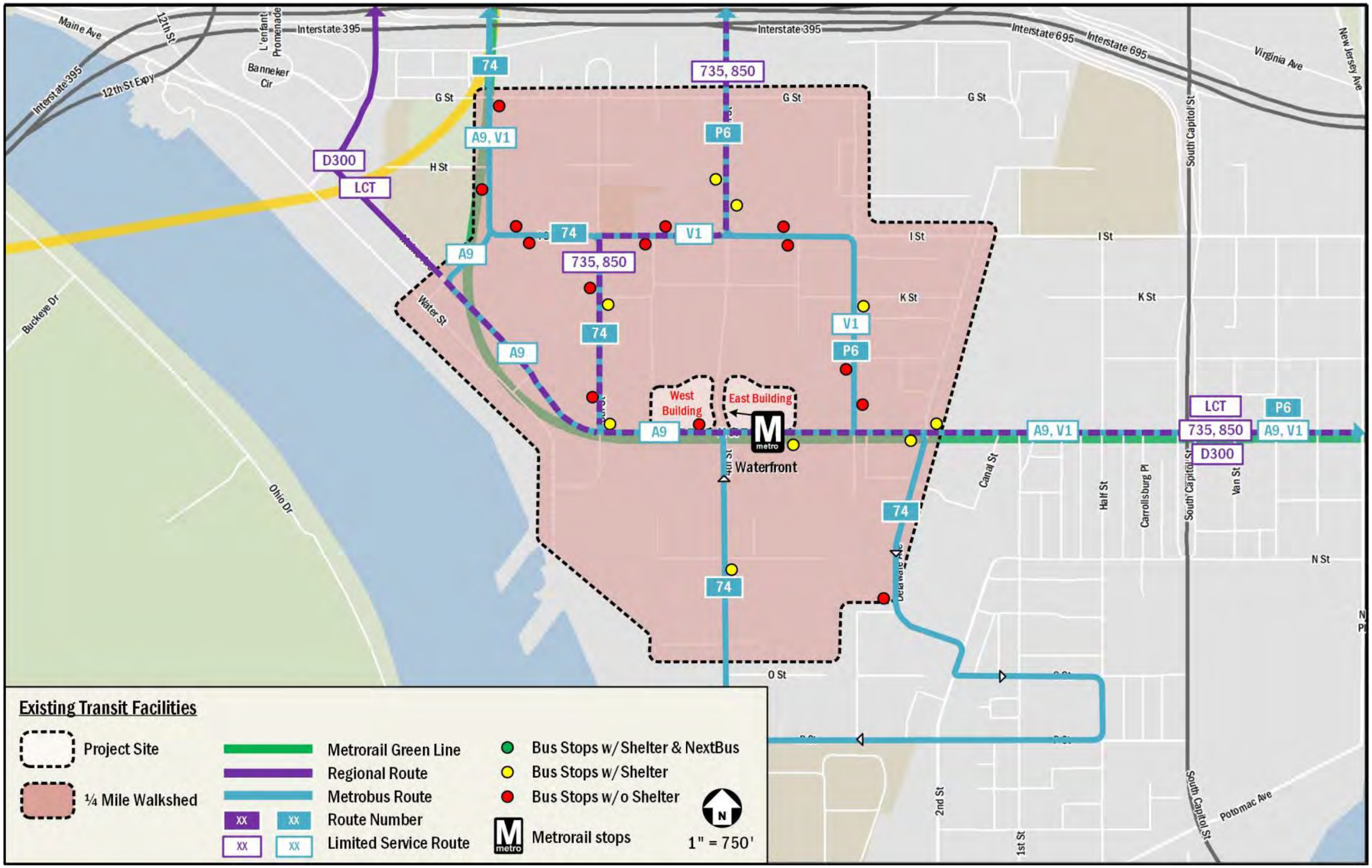

Figure 28: Existing Transit Service

PEDESTRIAN FACILITIES

This section summarizes the existing and future pedestrian access to the sites and reviews walking routes to and from the M Street Sites.

The following conclusions are reached within this chapter:

- The existing pedestrian infrastructure surrounding the M Street Sites provides an adequate walking environment. There are some gaps in the system, but there are sidewalks along the majority of primary routes to pedestrian destinations.
- Some sidewalks along 6th Street are temporarily closed due to the construction of developments near the sites. Pedestrian detours have been provided and marked.
- The M Street Sites are expected to generate a manageable number of pedestrian trips; however, the pedestrian trips generated by walking to and from transit will be more substantial, particularly to and from the Waterfront Metrorail Station.

PEDESTRIAN STUDY AREA

Facilities within a quarter-mile of the M Street sites were evaluated as well as routes to nearby transit facilities and prominent retail and neighborhood destinations. The sites are easily accessible to transit options, such as an adjacent Metrorail station and bus stops directly in the vicinity of the sites along I (Eye) Street, M Street, and 3rd Street. There are some areas of concern near the M Street Sites that negatively impact the quality of and attractiveness of the walking environment. This includes roadway conditions that reduce the quality of walking conditions, narrow sidewalks, and incomplete or insufficient crossings. Figure 29 shows suggested pedestrian pathways, walking time and distances, and barriers and areas of concern.

PEDESTRIAN INFRASTRUCTURE

This section outlines the existing and proposed pedestrian infrastructure within the pedestrian study area.

Existing Conditions

A review of pedestrian facilities surrounding the M Street Sites shows that most facilities meet DDOT standards and provide a quality walking environment. Figure 30 shows a detailed inventory of the existing pedestrian infrastructure surrounding the sites. Sidewalks, crosswalks, and curb ramps are evaluated based on the guidelines set forth by DDOT's *Design and Engineering Manual (2017)* in addition to ADA standards. Sidewalk widths and requirements for the District are shown below in Table 18.

Within the area shown, the majority of roadways are considered residential with a low to moderate density. Most of the sidewalks surrounding the sites comply with DDOT standards; however, areas near The Wharf development to the west have inadequate sidewalks or no sidewalks at all, with insufficient or no buffer due to on-going construction. All will meet DDOT standards once construction is completed; therefore insufficiencies are temporary. All primary pedestrian destinations are accessible via routes with sidewalks, most of which meet DDOT standards.

ADA standards require that curb ramps be provided wherever an accessible route crosses a curb and must have a detectable warning. Additionally, curb ramps shared between two crosswalks are not desired. As shown in Figure 30, under existing conditions crosswalks and curb ramps with detectable warnings are present adjacent to the sites.

Pedestrian Infrastructure Improvements

As a result of the background developments, pedestrian facilities throughout the neighborhood will be improved to meet DDOT and ADA standards. This includes sidewalks that meet or exceed the width requirements, crosswalks at all necessary locations, curb ramps with detectable warnings. The

Table 18: Sidewalk Requirements

Street Type	Min. Buffer Width	Min. Sidewalk Unobstructed Width	Total Min. Sidewalk Width
Low- to Moderate-Density Residential	4-6 ft	6 ft	10 ft
High-Density Residential	4-8 ft	8 ft	13 ft
Central DC and Commercial Areas	4-10 ft	10 ft	16 ft

inclusion of benches, planting beds, and additional streetlights will result in improvements over existing conditions.

In addition to pedestrian facilities in relation to background developments, the Applicant is proposing to improve the public realm within and surrounding the Waterfront Metrorail Station Plaza, including the intersection of 4^{th} Street with the shared pedestrian/vehicle plaza.

The existing and proposed public realm plans are shown previously on Figure 12. The public realm improvements were vetted with DDOT and are intended to directly address the community's stated concerns. The improvements aim to better delineate vehicular and pedestrian space, while maintaining the unique character of the plaza and to create a safer overall intersection. This is primarily accomplished by reorganizing the pavement types, removing the southern crosswalk, removing the painted median south of the pedestrian refuge, installing planting beds, and installing a raised planting island and pedestrian refuge on the north side of the intersection.

SITE IMPACTS

Pedestrian Trip Generation

The East M Street Site is projected to generate 38 walking trips (13 inbound, 25 outbound) during the morning peak hour, and 76 walking trips (42 inbound, 34 outbound) during the afternoon peak hour.

The West M Street Site is projected to generate 36 walking trips (12 inbound, 24 outbound) during the morning peak hour, and 71 walking trips (39 inbound, 32 outbound) during the afternoon peak hour.

The origins and destinations of these trips are likely to be:

- Employment opportunities where residents can walk to work;
- Retail locations outside of the sites; and
- Neighborhood destinations such as schools, libraries, and parks in the vicinity of the sites.

In addition to these trips, the transit trips generated by the sites will also generate pedestrian demand between each site and nearby transit stops.

Currently the existing pedestrian network has the capacity to absorb the newly generated trips from the sites. No new pedestrian connections to the site are proposed.

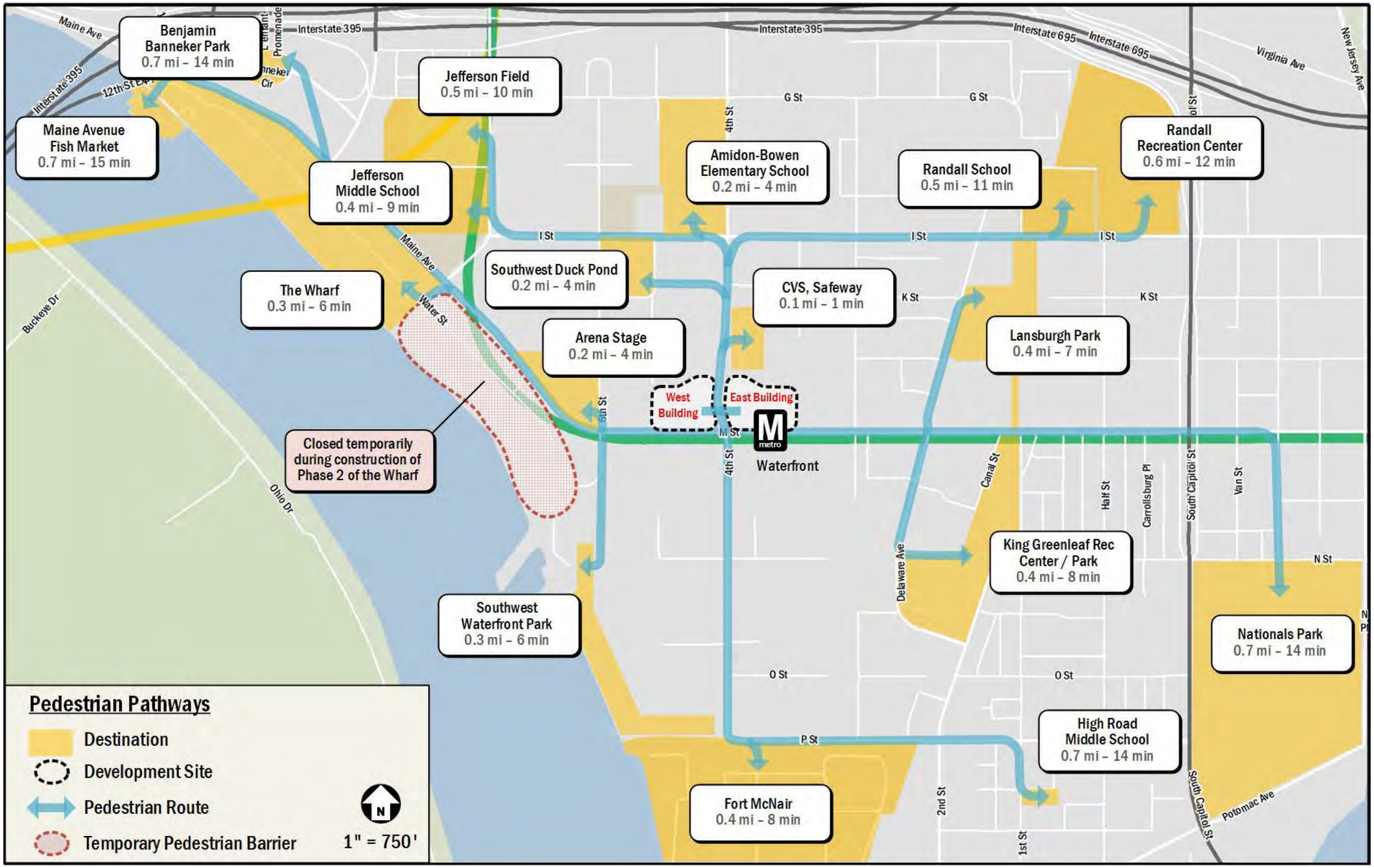

Figure 29: Pedestrian Pathways

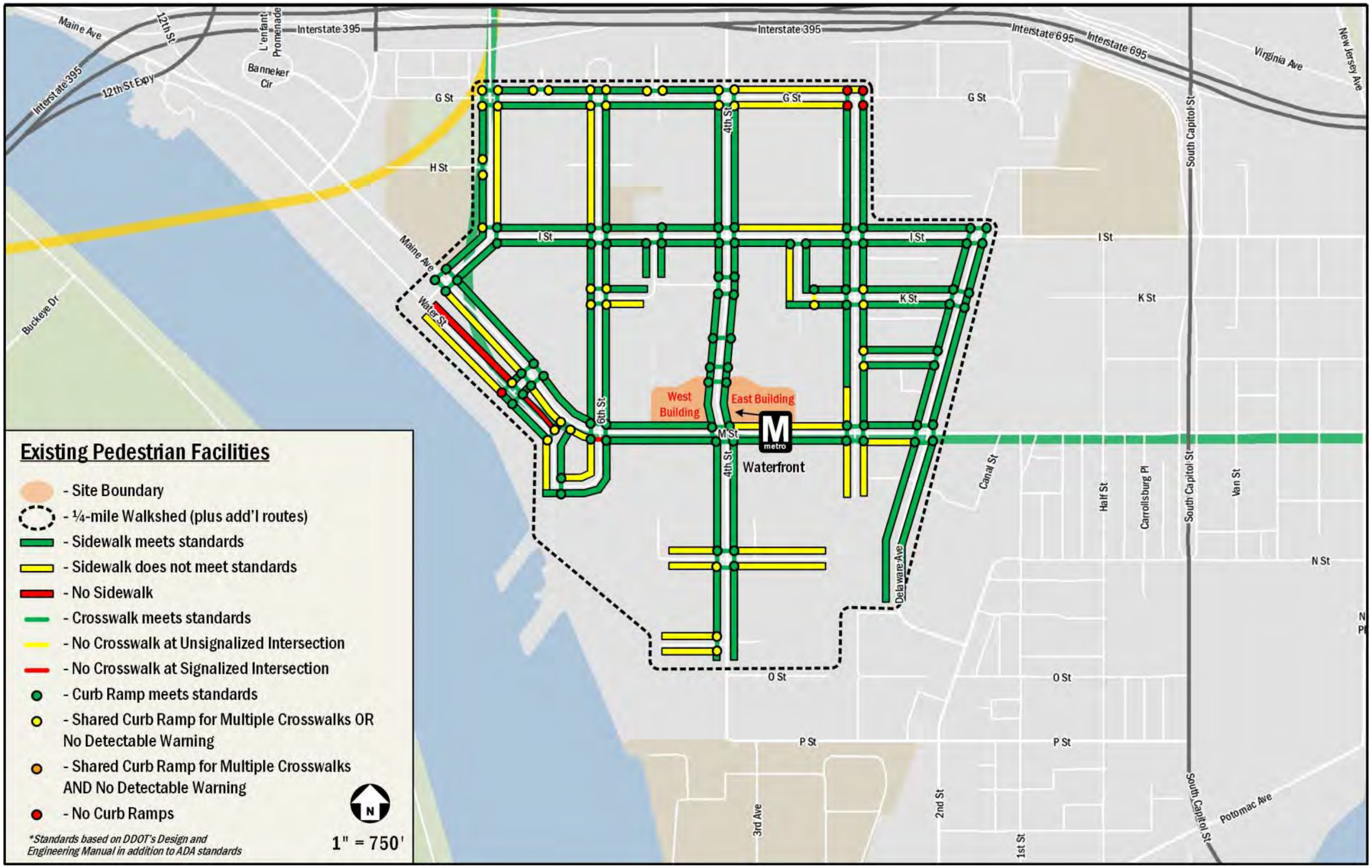

Figure 30: Existing Pedestrian Infrastructure

BICYCLE FACILITIES

This section summarizes existing and future bicycle access, reviews the quality of cycling routes to and from the M Street Sites, and presents recommendations.

The following conclusions are reached within this chapter:

- The M Street Sites have access to several on- and off-street bicycle facilities including bicycle lanes on 4th Street and I (Eye) Street.
- All site-generated bike trips can be accommodated on existing infrastructure.
- The M Street Buildings will include secure bicycle parking on-site for residents and employees of the buildings.
- The M Street Buildings will include short-term bicycle racks along the perimeter of the sites.

EXISTING BICYCLE FACILITIES

The M Street Sites have excellent connectivity to existing on- and off-street bicycle facilities. Residential low volume streets surrounding the sites provide connectivity to existing bicycle facilities near the sites. The sites are adjacent to bicycle lanes along 4th Street and I (Eye) Street, which intersect just north of the sites. Signed routes are located on M Street, 3rd Street, and Water Street. These bicycle facilities provide the sites with connectivity to areas within the District, Maryland and Virginia. Figure 31 illustrates the existing bicycle facilities in the area.

Under existing conditions, short-term bicycle parking is located near the perimeter of the sites at the entrance to the Waterfront Metrorail Station.

The Capital Bikeshare program provides additional cycling options for residents, employees, and patrons of the planned development. The Bikeshare program has placed over 440 Bikeshare stations across Washington, DC, Arlington, and Alexandria, VA, Montgomery County, MD, and most recently Fairfax County, VA, with over 3,700 bicycles provided. Capital Bikeshare currently has an existing Capital Bikeshare station with 19 available bicycle docks adjacent to the sites at 4th Street and M Street SW. An additional bikeshare station is located at 6th Street and Water Street SW with 18 available bicycle docks. Figure 31 illustrates the existing Capital Bikeshare facilities in the area.

Bike-sharing is also provided by Mobike, LimeBike, Spin and Jump, which provides point-to-point dockless bike-sharing. The four (4) companies currently have fleets of bicycles located throughout the District. Mobike, LimeBike and Spin bicycles may be parked and locked anywhere while Jump bicycles must be locked at a bike rack or a sign. Bicycle availability is tracked through the mobile phone application for each company. Current DDOT regulations limits each bike-sharing company to a maximum of 400 bikes.

PROPOSED BICYCLE FACILITIES

MoveDC

The MoveDC plan outlines several bicycle improvements in the vicinity of the sites. These improvements are broken up into four tiers that rank the priority for implementation. The four tiers are broken down as follows:

Tier 1

Investments should be considered as part of DDOT's 6-year Transportation Improvement Program (TIP) and annual work program development, if they are not already included. Some projects may be able to move directly into construction, while others become high priorities for advancement through the Project Development Process.

Tier 2

Investments within this tier are not high priorities in the early years of MoveDC implementation. These investments could begin moving through the Project Development Process if there are compelling reasons for their advancement.

Tier 3

Investments within this tier are not priorities for DDOT-led advancement in the early years of MoveDC's implementation. They could move forward earlier under circumstances, such as real estate development initiatives and non-DDOT partnerships providing the opportunity for non-District-led completion of specific funding.

Tier 4

Generally, investments within this tier are not priorities for DDOT-led advancement and are lower priority for project development in the early years of implementation.

Due to the timeline of the proposed development, this report will focus on the Tier 1 and Tier 2 recommendations within the vicinity of the sites.

There are two (2) Tier 1 additions that will positively affect bicycle connectivity to and from the sites. Improvements to 4th Street and P Street SW south of M Street are planned, which will create a bicycle link from the sites to Audi Field, which is currently under construction, and other destinations. These facilities will greatly improve the bicycle connectivity near the sites.

There are two (2) Tier 2 additions that will positively affect bicycle connectivity to and from the sites. A bicycle trail/bridge extending from Water Street to Ohio Drive SW at Hains Point spanning the Washington Channel, and improvements to 4th Street SW/NW between I Street SW and Pennsylvania Avenue NW are planned. This facility will greatly improve the bicycle connectivity near the sites.

As a part of the Wharf development, a 10-foot wide, bi-directional, grade-separated cycle track is proposed along Maine Avenue between the Fish Market and Water Street.

As part of the 680 Eye Street SW development, a bicycle lane from Maine Avenue SW to I Street SW will be added where none exists today. These bicycle lanes (one in each direction) will connect the existing bicycle lanes on I Street to the cycle track being constructed as part of the Wharf development.

Site Impacts

Bicycle Trip Generation

The East M Street Site is projected to generate 12 bicycle trips (4 inbound, 8 outbound) during the morning peak hour, and 19 bicycle trips (10 inbound, 9 outbound) during the afternoon peak hour.

The West M Street Site is projected to generate 11 bicycle trips (4 inbound, 7 outbound) during the morning peak hour, and 18 bicycle trips (10 inbound, 8 outbound) during the afternoon peak hour.

Although bicycling will be an important mode for getting to and from the sites, with significant facilities located nearby and existing and planned routes to and from the sites, there will be no perceivable impacts from bicycling on the existing network.

On-Site Bicycle Elements

The projects will include short-term bicycle racks at street level along the perimeter of the sites. These short-term spaces will include inverted U-racks placed in a high-visibility area. The Applicant is coordinating with DDOT to locate these racks in public space.

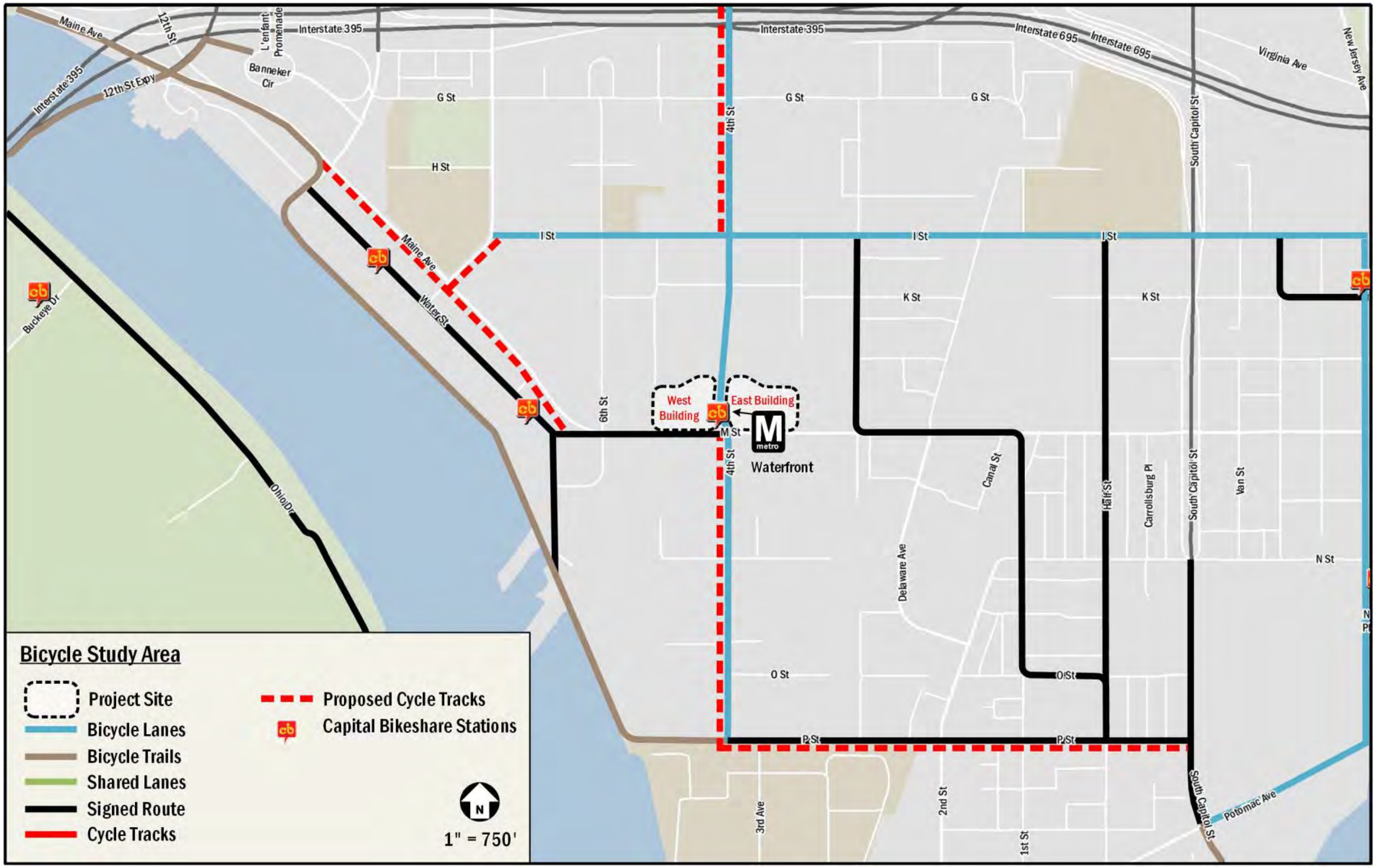

Figure 31: Existing and Proposed Bicycle Facilities

Crash Data Analysis

This section of the report reviews available crash data within the vehicular study area, reviews potential impacts of the M Street Sites on crash rates, and makes recommendations for mitigation measures where needed.

Summary of Available Crash Data

A crash analysis was performed to determine if there was an abnormally high crash rate at any study area intersection. DDOT provided the last three years of available intersection crash data, from 2013 to 2015 for the study area. This data was reviewed and analyzed to determine the crash rate at each location. For intersections, the crash rate is measured in crash per million-entering vehicles (MEV). The crash rates per intersections are shown in Table 19.

According to the Institute of Transportation Engineers' *Transportation Impact Analysis for Site Development*, a crash rate of 1.0 or higher is an indication that further study is required. As shown in Table 19, two (2) intersections in this study area meet this criterion. The M Street Sites should be developed in a manner to maintain or minimize the conflicts at the study intersections.

A rate over 1.0 does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have higher crash rates due to operational, geometric, or other deficiencies. Additionally, the crash data does not provide detailed location information. In some cases, the crashes were located near the intersections and not necessarily within the intersection.

For the two (2) intersections with elevated crash rates, the crash type information from the DDOT crash data was reviewed to see if there is a high percentage of certain crash types. Generally, the reasons for why an intersection has a high crash rate cannot be derived from crash data, as the exact details of each crash are not represented. However, some summaries of crash data can be used to develop general trends or eliminate possible causes. Table 20 contains a breakdown of crash types reported for the one intersection with a crash rate over 1.0 per MEV.

Table 19: Intersection Crash Rates

Intersection		Total Crashes	Ped Crashes	Bike Crashes	Rate per MEV*
1.	7th Street & I Street, SW	5	0	0	0.39
2.	6th Street & I Street, SW	6	1	0	0.59
3.	I Street & Mackemie Place, SW^	--	--	--	--
4.	4th Street & I Street, SW	13	2	2	0.79
5.	3rd Street & I Street, SW	3	0	2	0.25
6.	6th Street & K Street, SW	4	0	0	**1.25**
7.	K Street & Mackemie Place, SW^	6	0	0	0.15
8.	4th Street & Pedestrian Plaza, SW^	--	--	--	--
9.	7th Street & Maine Avenue, SW	15	0	0	0.47
10.	6th Street & Maine Avenue / M Street, SW	11	3	0	0.40
11.	M Street & West Alley, SW^	--	--	--	--
12.	4th Street & M Street, SW	45	3	0	**1.38**
13.	M Street & East Alley, SW^	--	--	--	--
14.	3rd Street & M Street, SW	5	0	0	0.43

** - Million Entering Vehicles; Volumes estimated based on turning movement count data*

^ - Crash Data Unavailable

Potential Impacts

This section reviews the two locations with existing crash rates over 1.0 MEV and reviews potential impacts of the proposed development.

- *6th Street SW & K Street SW*
  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.25 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were right-angle and rear-ended vehicles. At unsignalized locations, rear-end crashes can occur when turning vehicles are queued waiting for gaps in traffic.

  The safety concerns at this intersection are primarily due to the existing lane configurations and operations. The site-generated traffic at this intersection is minimal and not expected to degrade the safety; thus, no improvements are recommended as part of the proposed development.

- *4th Street SW & M Street SW*
  This intersection is over the threshold of 1.0 crashes per MEV, with a rate of approximately 1.38 crashes per MEV over the course of the 3-year study period. The majority of crashes at this intersection were sideswipes and rear-ended vehicles. Sideswipe crashes can often occur when a vehicle makes a last-second lane change or in a location with a significant presence of on-street parking. Rear-end crashes can occur when turning vehicles are queued waiting for gaps in traffic.

  The safety concerns at this intersection are primarily due to the existing lane configurations and operations. The site-generated traffic at this intersection is minimal and not expected to degrade the safety; thus, no improvements are recommended as part of the proposed development.

Table 20: Crash Type Breakdown

Intersection	Rate per MEV	Right Angle	Left Turn	Right Turn	Rear End	Side Swiped	Head On	Parked	Fixed Object	Ran Off Road	Ped. Involved	Backing	Non-Collision	Under/Over Ride	Unspecified	Total
6th Street & K Street, SW	1.25	1	0	0	1	0	0	0	0	0	0	0	0	0	2	4
		25%	*0%*	*0%*	*25%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*50%*	
4th Street & M Street, SW	1.38	1	2	1	7	19	2	4	2	0	2	4	0	0	1	45
		2%	*4%*	*2%*	*16%*	*42%*	*4%*	*9%*	*4%*	*0%*	*4%*	*9%*	*0%*	*0%*	*2%*	

SUMMARY AND CONCLUSIONS

The following report is a Comprehensive Transportation Review (CTR) for the Stage 2 Planned Unit Development (PUD) and modification to the approved PUD for 375 and 425 M Street SW (the "East M Street Site and the West M Street Site," respectively, or "M Street Sites," collectively). The report reviews the transportation aspects of the project's PUD application (Zoning Commission Case Number 02-38I).

The purpose of this study is to evaluate whether the proposed buildings on the East and West M Street Sites (the "East Building" and the "West Building", respectively, or the "M Street Buildings", collectively) will generate a detrimental impact to the surrounding transportation network. This evaluation is based on a technical comparison of the existing conditions, background conditions, and future conditions. This report concludes that **the M Street Sites will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigation measures are implemented.

Approved First-Stage PUD

The East M Street Site is currently undeveloped and is generally bounded by a shared vehicle/pedestrian plaza to the north, M Street SW to the south, a private drive to the east, and 4th Street SW to the west. The West M Street Site is also currently undeveloped and is generally bounded by a shared vehicle/pedestrian plaza to the north, M Street SW to the south, 4th Street SW to the east, and a private drive to the west.

The M Street Sites are a part of the larger Waterfront Station PUD approved as a Stage 1 PUD in July 2003 (Zoning Commission Order No. 02-38) that included a medium-high density project containing a mixture of office, retail, and residential uses with an overall gross floor area of 2,526,500 square feet (the "Overall PUD"). The Stage 1 PUD also included the re-opening of 4th Street through the Overall PUD Site.

A Modified Stage 1 PUD (and Stage 2 approval for the center portion of the Overall PUD Site) was previously approved by the Zoning Commission on November 17, 2007, by Zoning Commission Order No. 02-38A (the "First Stage PUD" or "ZC Order No. 02-38A"). In ZC Order No. 02-38A, the Zoning Commission approved the construction of six new buildings and the conversion of two existing buildings to residential use on the Overall PUD Site. The approved First-Stage PUD included a comprehensive circulation and site access plan that was based on the reintroduction of 4th Street, and the creation of two north-south private drives to provide primary access to parking and loading.

The First Stage PUD approved the M Street Sites to be redeveloped as office buildings with ground floor retail. The East Building was approved as a 339,815 SF commercial office building with below-grade parking spaces accessed from a new curb cut on M Street and loading facilities accessed from the north-south private drive on the east side of the East Building. The West Building was approved as a 322,785 SF commercial office building with below-grade parking spaces accessed from a second new curb cut on M Street and loading facilities accessed from the north-south private drive on the west side of the West Building.

Proposed Project for the M Street Sites

The proposed Second-Stage PUD and modification to the First Stage PUD proposes to change the primary use of the M Street Buildings from office to residential. The proposed development programs for the East and West Buildings consist of the following elements:

- **East Building:** The project is proposed to include 18,640 SF of office space, 21,930 SF of retail space, 308 residential units, and 198 below-grade parking spaces.
- **West Building:** The project is proposed to include 19,370 SF of office space, 19,940 SF of retail space, 296 residential units, and 165 below-grade parking spaces.

Vehicular access to the below-grade parking garage for the East Building will be from the north-south private drive on the east side of the building. This private drive will also facilitate trash pickup and loading operations, which will be located adjacent to the garage access. The private drive connects to the pedestrian plaza to the north and M Street SW to the south.

Vehicular access to the below-grade parking garage for the West Building will be from the north-south private drive on the west side of the building. This private drive will also facilitate trash pickup and loading operations, which will be located adjacent to the garage access. The private drive connects Makemie Place/K Street to the north and M Street SW to the south.

This access and circulation plan is a significant improvement over the access plan approved in the First Stage PUD, which included a total of four (4) curb cuts along M Street. Overall, the updated vehicular access plan, which eliminates two (2) curb cuts along M Street, results in a lessened impact along M Street for all roadway users and an improved pedestrian realm.

It should also be noted that the change in land use from office to residential will generate fewer vehicular trips. Industry standards show that when all other factors are the same, residential land uses generate fewer vehicular trips than office land uses.

The proposed parking and loading plans for the M Street Buildings meet or exceed zoning requirements and will accommodate the anticipated parking and loading demand for the proposed land uses. Additionally, the amount of parking and loading facilities is consistent with the parking and loading requirements for the Overall PUD, as approved in Z.C. Order No. 02-38A.

Most pedestrian facilities surrounding the M Street Sites meet DDOT and ADA standards and provide a quality walking environment. As a result of the background developments, pedestrian facilities throughout the neighborhood will be improved to meet DDOT and ADA standards. This includes sidewalks that meet or exceed the width requirements, crosswalks at all necessary locations, and curb ramps with detectable warnings. The inclusion of benches, planting beds, and additional streetlights will result in improvements over existing conditions.

The M Street Buildings will supply interior long-term bicycle parking and exterior short-term bicycle parking along the perimeter of the buildings that meet zoning requirements and anticipated demand.

Multi-Modal Impacts and Recommendations

Transit

The M Street Sites are served by eight (8) Metrobus routes and regional commuter buses that provide connectivity to the downtown core and other areas of the District, Maryland, and Virginia. The sites are located directly adjacent to the Waterfront Metrorail Station.

Although the M Street Buildings will be generating new transit trips, existing facilities have sufficient capacity to accommodate the new trips.

Pedestrian

The M Street Sites are surrounded by a generally well-connected pedestrian network. Most roadways within a quarter-mile radius provide sidewalks and acceptable crosswalks and curb ramps, particularly along the primary walking routes. However, there are areas near The Wharf to the west of the sites that have inadequate sidewalks or no sidewalks at all, with insufficient or no buffer due to on-going construction. However, these insufficiencies are only temporary and will be improved to meet or exceed DDOT standards following completion of construction of the Wharf. As a result of the background developments, pedestrian facilities in the vicinity of the M Street Sites will be improved to meet DDOT and ADA standards.

In addition to pedestrian facilities on each of the M Street Sites and directly surrounding the sites, the Applicant is also proposing to improve the public realm within and surrounding the Waterfront Metrorail Station Plaza, including the intersection of 4th Street with the pedestrian/vehicle plaza.

Bicycle

The M Street Sites have excellent connectivity to existing on- and off-street bicycle facilities. The sites are adjacent to bicycle lanes along 4th Street and I (Eye) Street. Signed routes are located on M Street, 3rd Street, and Water Street.

The M Street Buildings will supply interior long-term bicycle parking and exterior short-term bicycle parking along the perimeter of the buildings that meet zoning requirements and anticipated demand.

Vehicular

The M Street Sites are well-connected to Interstate 395 and several principal and minor arterials such as Independence Avenue, South Capitol Street, Maine Avenue, M Street and an existing network of collector and local roadways.

In order to determine impacts that the M Street Sites will have on the transportation network, this report projects future conditions with and without the development of the M Street Sites, and performs analyses of intersection delays and queues. These results were compared to the acceptable levels of delay set by DDOT standards as well as existing queues to determine if development of the M Street Sites will negatively impact the study area. The analysis concluded that two (2) intersections trigger the need to explore mitigations for the 2019 Total

Future Conditions scenario. Details of the vehicular capacity analysis are described below.

Of note, vehicular capacity analyses performed during the First Stage PUD approvals did not identify specific impacts or mitigations for the M Street Sites alone. Instead, mitigation measures for the overall PUD were recommended. The primary mitigation approved in the First Stage PUD was the reintroduction of 4th Street between I Street and M Street SW. This mitigation was completed during a previous phase of the overall development. Mitigation measures for each individual building or phase within the overall PUD were expected to be determined during each subsequent Second Stage PUD application. As such, this CTR identifies additional mitigation measures necessary for the M Street Sites specifically.

The following conclusions regarding vehicular trips and proposed mitigation measures are reached within this report.

Existing Conditions

- This scenario evaluates vehicular operations as they occur today in 2017 conditions.
- Two (2) intersections operate at unacceptable conditions in existing conditions:
  - *M Street & 4th Street, SW*
    During the AM peak hour, the westbound and northbound approaches operate at unacceptable levels of service. During the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
  - *M Street & 3rd Street, SW*
    During the PM peak hour, the southbound approach operates at unacceptable levels of service.

Background Conditions

- This scenario evaluates vehicular operations as they are forecasted to occur in future 2019 conditions assuming no development of the M Street Sites.
- Four (4) intersections operate at unacceptable conditions under background conditions, due to the addition of background development-related trips and inherent growth on the roadway network:
  - *I Street & 7th Street, SW*
    During the PM peak hour, the southbound approach operates at unacceptable levels of service.
  - *Maine Avenue & 7th Street, SW*
    During the PM peak hour, the southbound approach operates at unacceptable levels of service.
  - *M Street & 4th Street, SW*
    Consistent with existing conditions, during the AM peak hour, the westbound and northbound approaches operate at unacceptable levels of service. Additionally, the overall intersection degrades to unacceptable levels of service.
    Consistent with existing conditions, during the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.
  - *M Street & 3rd Street, SW*
    Consistent with existing conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service.

Future Conditions

- This scenario evaluates vehicular operations as they are forecasted to occur in future 2019 conditions with the addition of new trips generated by the M Street Sites.
- Four (4) intersections operate at unacceptable conditions under future conditions, due to the addition of trips generated by the M Street Buildings:
  - *I Street & 7th Street, SW*
    Consistent with the background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. Additionally, the overall intersection degrades to unacceptable levels of service. Therefore, this intersection is impacted by the addition of site-generated trips during the PM peak hour.
  - *Maine Avenue & 7th Street, SW*
    Consistent with background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. The addition of site-generated trips is not expected to increase the southbound approach delay by more than 5 seconds over the background conditions. Therefore, this intersection is not considered to be impacted by the addition of site-generated trips according to DDOT standards.
  - *M Street & 4th Street, SW*
    Consistent with background conditions, during the AM peak hour, the westbound and northbound

approaches, as well as the overall intersection operate at unacceptable levels of service.

Consistent with existing conditions, during the PM peak hour, the eastbound and westbound approaches, as well as the overall intersection operate at unacceptable levels of service.

During the AM peak hour only, the overall intersection and westbound approach delays increase by more than 5 seconds over the background conditions. Therefore, this intersection is impacted by the addition of site-generated trips during the AM peak hour. Delay experienced during the PM peak hour does not increase by more than 5 seconds over the background conditions.

- o *M Street & 3rd Street, SW*

  Consistent with background conditions, during the PM peak hour, the southbound approach operates at unacceptable levels of service. The addition of site-generated trips is not expected to increase the southbound approach delay by more than 5 seconds over the background conditions. Therefore, this intersection is not considered to be impacted by the addition of site-generated trips.

- As stated above, development of the M Street Sites will impact two (2) study intersections by increasing traffic at specific peak-hour time periods. The intersection at M and 4th Streets SW will be impacted in the morning peak hour, and the intersection at I and 7th Streets SW will be impacted in the afternoon peak hour.
- The intersection of M Street & 4th Street operates at unacceptable levels of service in existing conditions during both the AM and PM peak hours and is exacerbated by the addition of trips generated by future background developments and the M Street Sites. Only during the AM peak hour does the delay increase such that mitigation measures are required. The proposed mitigation measure for the M Street & 4th Street intersection is to shift green time to the east-west approaches. Adjusting signal timing in this manner will decrease delay to levels that are improved over background conditions, and therefore sufficiently mitigates the additional trips generated by development of the M Street Sites.
- The intersection of 7th and I Street operates at acceptable conditions under existing conditions. Under background conditions the intersection operates at unacceptable levels of service during and is further exacerbated by the addition of trips generated by the M Street Sites. The proposed mitigation measure at 7th Street & I Street is to extend the signal cycle length from 75 seconds to 120 seconds, which is consistent with the adjacent intersections along 7th Street. This mitigation results in acceptable levels of service under future conditions, and it is recommended that DDOT implement changes to the signal cycle as part of implementing the signal and intersection improvements at this location associated with the 680 I Street SW PUD.

Transportation Demand Management (TDM)

A TDM plan was approved under the First Stage PUD application and the Applicant proposed the following TDM measures for the project:

- Designate a member(s) of the property management team as Property Transportation Coordinator who will be the primary point of contact and will be responsible for coordinating and completing TDM obligations on behalf of the Applicant. The applicant will provide the name of the Property Transportation Coordinator to the District Department of Transportation.
- Provide effective directional signage subject to the Applicant's Comprehensive Sign Plan (parking, deliveries, taxi stand, etc.) to direct residents and visitors to appropriate locations on the property.
- Provide Zip Cars/Flex Cars on site.
- Provide SmartTrip cards, during first time lease-up only, at a maximum cost to the developer of $10.00 per card, per person for free to residents and full-time office employees.
- Encourage new residents and office employees to use Metrorail, Metrobus or DC Circulator services through the following means:
  - Distribute in new-tenant and new-resident packages, materials provided by DDOT including site-specific transit-related information to all persons or entities signing leases;
  - Place a reference to the Waterfront Metro Station in promotional materials and advertisements; and
  - Participate in Ozone Action Days and other regionally sponsored clean air and traffic mitigation promotions by posting notice of such promotions in locations within the building acceptable to the developer.

Since the First Stage PUD TDM measures were approved, TDM best practices have evolved in the District and DDOT has different expectations. Therefore, the Applicant is proposing to update the TDM plan to reflect current DDOT and industry standards. As a part of the modified PUD for the M Street Buildings, the Applicant will provide the following additional/updated TDM measures:

- The Applicant will identify a TDM Leader (for planning, construction, and operations). The TDM Leader will work with residents and tenants of the M Street Buildings to distribute and market various transportation alternatives and options. This includes providing TDM materials to new residents and tenants in a Welcome Package.
- The Applicant will provide enhanced pedestrian treatments and increase pedestrian safety through pavement treatments, crosswalk changes, and signage at 4th Street in the vicinity of the Metro station and the east-west private driveways.
- The Applicant will provide SmarTrip cards, during first time lease-up only, at a maximum cost to the developer of $20.00 per card, per person for free to residents and full-time office employees.
- The Applicant will post all TDM commitments online, publicize availability, and allow the public to see what commitments have been promised.
- The Applicant will provide website links to CommuterConnections.com and goDCgo.com on property websites.
- The Applicant will install a Transportation Information Center Display (electronic screen) within the residential lobby of the M Street Buildings, containing information related to local transportation alternatives.
- The Applicant will meet the 2016 Zoning Regulations' requirements for short and long-term bicycle parking. This includes secure interior bicycle parking and short-term exterior bicycle parking around the perimeter of the M Street Sites.
- The Applicant will unbundle all parking from the cost of the lease or purchase of residential units. Parking costs will be set at no less than the charges of the lowest fee garage located within a ¼ mile.

Summary and Recommendations

Overall, the M Street Sites provide many positive transportation features, including:

- The M Street Sites are adjacent to the Waterfront Metrorail Station and within close proximity to Metrobus stops of routes along major corridors.
- The proposed parking plan meets zoning requirements and anticipated demand for the proposed land uses. Additionally, the amount of parking is consistent with the approved parking requirements for the Overall PUD.
- The M Street Sites have access to several on- and off-street bicycle facilities including bicycle lanes on 4th Street and I (Eye) Street.
- The inclusion of secure long-term bicycle parking spaces within the M Street Sites will meet zoning requirements.
- The installation of short-term bicycle parking spaces around the perimeter of the M Street Sites will meet zoning requirements.
- Improvements to the adjacent pedestrian plaza along 4th Street at the entrance to the Waterfront Metrorail Station will enhance pedestrian safety.
- The Applicant will reduce the number of curb-cuts along M Street and eliminate a median break on M Street, which will be a significant improvement over the access plan approved in the First Stage PUD.
- The total number of vehicular trips will be reduced as a result of the change in the development program.
- The Applicant proposes signal timing adjustment mitigation measures at two (2) intersections: 7th & I Street, SW and 4th & M Street, SW. These adjustments will decrease delay over background conditions.
- The Applicant will incorporate a robust Transportation Demand Management (TDM) plan to reduce the demand of single-occupancy vehicles, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.

Based on these features and the technical analysis contained within, this report concludes that **the M Street Sites will not have a detrimental impact** to the surrounding transportation network assuming that all planned site design elements and mitigation measures are implemented.