

COMPREHENSIVE TRANSPORTATION REVIEW

THE WHARF PHASE 2 PUD

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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.....	7
Project Design	14
Parcel Overview	14
Open Spaces and Thoroughfares	27
Site Access and Circulation	36
Loading.....	37
Parking	38
Bicycle and Pedestrian Facilities	40
Curbside Management	41
Transportation Demand Management (TDM).....	42
Trip Generation.....	59
Traffic Operations	61
Study Area, Scope, & Methodology	61
Transit	109
Existing Transit Service	109
Planned Transit Service.....	109
Site-Generated Transit Impacts	111
Pedestrian Facilities	118
Pedestrian Study Area.....	118
Pedestrian Infrastructure.....	118
Site Impacts.....	119
Bicycle Facilities	128
Existing Bicycle Facilities	128
Planned Bicycle Facilities	128
Site Impacts.....	130
Crash Data Analysis.....	134
Summary of Available Crash Data.....	134
Potential Impacts	135
Summary and Conclusions.....	136

Figures

Figure 1: Site Location.....	3
Figure 2: Site Aerial	4
Figure 3: Summary of Walkscore and Bikescore.....	7
Figure 4: Major Regional Transportation Facilities	11
Figure 5: Major Local Transportation Facilities.....	12
Figure 6: Planned Development Map	13
Figure 7: Project Phasing.....	18
Figure 8: Phase 2 Development Program	19
Figure 9: Ground Floor Plan – Parcels 6 and 7	20
Figure 10: Ground Floor Plan – Parcel 8	21
Figure 11: Ground Floor Plan – Parcel 9	22
Figure 12: Ground Floor Plan – Parcel 10	23
Figure 13: Ground Floor Plan – Water Building 1	24
Figure 14: Ground Floor Plan – Water Building 2	25
Figure 15: Ground Floor Plan – Water Building 3	26
Figure 16: M Street Landing.....	29
Figure 17: The Grove.....	30
Figure 18: The Terrace	31
Figure 19: Typical Cross-Section of Wharf Street	32
Figure 20: Typical Cross-Section of Maine Avenue.....	33
Figure 21: Typical Cross-Section of Marina Way.....	34
Figure 22: Typical Cross-Section of Water Street and The Alley.....	35
Figure 23: Shared Space Plan.....	45
Figure 24: Proposed Bicycle Facilities	46
Figure 25: Vehicular Access and Circulation	47
Figure 26: Loading Access.....	48
Figure 27: Weekday Phase 2 Parking Demand	52
Figure 28: Weekend Phase 2 Parking Demand	53
Figure 29: Existing Curbside Management	54
Figure 30: Motorcoach and On-Street Parking Data Collection Plan.....	55
Figure 31: Average Motorcoach Dwell Time.....	56
Figure 32: Proposed Curbside Management – Off-Peak Season	57
Figure 33 Proposed Curbside Management – Peak Season.....	58
Figure 34: Study Area Intersections	72
Figure 35: 2022 Background Peak Hour Traffic Volumes (1 of 3)	73
Figure 36: 2022 Background Peak Hour Traffic Volumes (2 of 3)	74

Figure 37: 2022 Background Peak Hour Traffic Volumes (3 of 3)	75
Figure 38: Phase 1 Site-Generated Peak Hour Volumes (1 of 3).....	76
Figure 39: Phase 1 Site-Generated Peak Hour Volumes (2 of 3).....	77
Figure 40: Phase 1 Site-Generated Peak Hour Volumes (3 of 3).....	78
Figure 41: 2022 Interim (with Phase 1) Peak Hour Traffic Volumes (1 of 3).....	79
Figure 42: 2022 Interim (with Phase 1) Peak Hour Traffic Volumes (2 of 3).....	80
Figure 43: 2022 Interim (with Phase 1) Peak Hour Traffic Volumes (3 of 3).....	81
Figure 44: Outbound Trip Distribution and Routing	82
Figure 45: Inbound Trip Distribution and Routing	83
Figure 46: Phase 2 Access Specific Outbound Trip Distribution and Routing	84
Figure 47: Phase 2 Access Specific Inbound Trip Distribution and Routing	85
Figure 48: Phase 2 Site-Generated Peak Hour Volumes (1 of 3).....	86
Figure 49: Phase 2 Site-Generated Peak Hour Volumes (2 of 3).....	87
Figure 50: Phase 2 Site-Generated Peak Hour Volumes (3 of 3).....	88
Figure 51: 2022 Future (with Phase 1 and Phase 2) Peak Hour Traffic Volumes (1 of 3)	89
Figure 52: 2022 Future (with Phase 1 and Phase 2) Peak Hour Traffic Volumes (2 of 3)	90
Figure 53: 2022 Future (with Phase 1 and Phase 2) Peak Hour Traffic Volumes (3 of 3)	91
Figure 54: 2022 Background without Development Lane Configurations and Traffic Controls (1 of 3).....	92
Figure 55: 2022 Background without Development Lane Configurations and Traffic Controls (2 of 3).....	93
Figure 56: 2022 Background without Development Lane Configurations and Traffic Controls (3 of 3).....	94
Figure 57: 2022 Interim with Phase 1 Lane Configurations and Traffic Controls (1 of 3)	95
Figure 58: 2022 Interim with Phase 1 Lane Configurations and Traffic Controls (2 of 3)	96
Figure 59: 2022 Interim with Phase 1 Lane Configurations and Traffic Controls (3 of 3)	97
Figure 60: 2022 Future with Phase 1 and Phase 2 Lane Configurations and Traffic Controls (1 of 3).....	98
Figure 61: 2022 Future with Phase 1 and Phase 2 Lane Configurations and Traffic Controls (2 of 3).....	99
Figure 62: 2022 Future with Phase 1 and Phase 2 Lane Configurations and Traffic Controls (3 of 3).....	100
Figure 63: Existing Transit Service.....	113
Figure 64: WMATA 52 Route – Proposed Route Restructuring	114
Figure 65: WMATA 74 Route – Proposed Route Restructuring	115
Figure 66: Southwest Neighborhood Shuttle Route	116
Figure 67: Future Transit Facilities.....	117
Figure 68: Pedestrian Pathways.....	123
Figure 69: Existing Pedestrian Infrastructure.....	124
Figure 70: Pedestrian Crossing Treatment.....	125
Figure 71: Benjamin Banneker Park Pedestrian Access Improvements	126
Figure 72: Future Pedestrian Facilities.....	127
Figure 73: Existing Bicycle Facilities	131

Figure 74: Proposed Bicycle Facilities 132

Figure 75: Future Bicycle Facilities 133

Tables

Table 1: Car-share within 0.25 miles of the Site	6
Table 2: Zoning Requirement for Bicycle Parking	41
Table 3: Required and Planned Loading Facilities.....	49
Table 4: Anticipated Daily Loading Demand	50
Table 5: Off-Street Parking Requirements	51
Table 6: Summary of Parking Demand.....	51
Table 7: Summary of Mode Split Assumptions	59
Table 8: Phase 2 Multi-Modal Trip Generation Summary	60
Table 9: Summary of Background Development Trip Generation	71
Table 10: Applied Annual and Total Growth Rates	71
Table 11: LOS Results	101
Table 12: Queueing Results (in feet).....	104
Table 13: Mitigated LOS Results	107
Table 14: Mitigated 95 th Percentile Queueing Results.....	108
Table 15: Metrobus/Regional Bus Route Information.....	112
Table 16: Transit Stop Requirements.....	112
Table 18: Sidewalk Requirements.....	118
Table 18: Crossing Treatment Selection Criteria.....	120
Table 19: Pedestrian Crossing Treatments Surrounding Site.....	121
Table 21: Intersection Crash Rates	134
Table 21: Crash Type Breakdown.....	135



EXECUTIVE SUMMARY

The following report is a Comprehensive Transportation Review (CTR) for the Second-Stage approvals for Phase 2 of the Wharf Planned Unit Development (PUD). The Zoning Commission Case Number is 11-03J.

The purpose of this study is to evaluate whether the project will generate a detrimental impact on 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 project will not have a detrimental impact** on the surrounding transportation network assuming that all planned site design elements are implemented.

First-Stage PUD Approvals

The Southwest Waterfront redevelopment project (“The Wharf”) is located between Maine Avenue and the Washington Channel along the Southwest Waterfront, and is broken up into 11 principal building parcels, a number of smaller landside and waterside structures, four major plazas, one large park, a waterfront promenade/shared space, as well as public and private piers stretching between the existing Maine Avenue Municipal Fish Market and 6th Street SW. A First-Stage PUD application covering the entire project site received Zoning Commission approval on October 11, 2011 (ZC Case 11-03).

A multi-modal traffic study was performed for the First-Stage approvals, and reviewed by DDOT during the PUD process. The study analyzed the impacts of the entire build-out of The Wharf.

With respect to parking facilities, the Commission authorized the construction of one or more below grade parking structures that would provide approximately 2, 100 - 2,650 parking spaces on two to three levels. The Applicant is also required to provide parking or storage for approximately 1,500 - 2,200 bicycles and sufficient loading facilities to accommodate the mix of uses on the PUD Site. Pursuant to Order No. 11-03, the precise amount of parking and loading facilities required for each Second-Stage development shall be specified by the Commission in each Second-Stage order.

Approved Second-Stage PUD Approvals

Since approving the First-Stage PUD, the Commission has granted Second-Stage PUD approvals to Parcel 1 (Order No. 11-

03C), Parcels 2, 3, 4, and 11 (Order No. 11-03A, as modified by Order No. 11-03G and 11-03H), Parcel 5 (Order No. 11-03B, as modified by Order No. 11-03D and 11-03I), the 7th Street Recreation Pier (Z.C. Order No. 11-03E), and Pier 4 (Order No. 11-03F). Many of these Second-Stage approvals also include approval of components of the waterside development; piers, parks and open spaces; ancillary buildings; and other adjacent spaces.

Collectively, these parcels (1, 2, 3, 4, 5, 11 and Pier 4) are referred to as Phase 1 of The Wharf. All of them are either constructed or currently under construction.

A multi-modal traffic study was performed for each Stage 2 approval, and reviewed by DDOT during the PUD process. A large study was performed for the approvals of Parcels 2, 3, 4, and 11, which focused primarily on those parcels, but also included an analysis of the impacts of the entire build-out of The Wharf.

Proposed Second-Stage PUD (“Phase 2”)

Phase 2 of The Wharf includes Parcels 6 to 10, as well as three additional structures (the Water Buildings) that will include retail and Marina related space. The resulting development of Phase 2 of The Wharf will be a mixed-use development consisting of seven (7) buildings with a total of approximately 547,504 square feet of office space, 317 residential dwelling units, 119,059 square feet of retail, 116 hotel rooms, and 250 boat slips, as follows:

- Parcel 6 of the development will include approximately 275,049 square feet of office space and approximately 16,866 square feet of retail.
- Parcel 7 of the development will include approximately 212,312 square feet of office space and approximately 19,543 square feet of retail.
- Parcel 8 of the development will include approximately 235 residential dwelling units, approximately 26,316 square feet of retail, and approximately 116 hotel rooms.
- Parcel 9 of the development will include approximately 82 residential condo dwelling units and approximately 16,080 square feet of retail.
- Parcel 10 of the development will include approximately 60,143 square feet of office space and approximately 16,171 square feet of retail.



- Water Building 1 will include approximately 11,033 square feet of retail and approximately 853 square feet of maritime support services.
- Water Building 2 will include approximately 13,050 square feet of retail and approximately 3,100 square feet of maritime support services.
- Water Building 3 will include approximately 5,175 square feet of maritime support services.
- Wharf Marina will include approximately 250 boat slips.

Proposed Modification from First-Stage PUD

The proposed second stage PUD for Phase 2 follows the First-Stage PUD closely with a few modifications.

First, Parcel 8 had a change in use. The First-Stage PUD approved Parcel 8 for either residential or office use above ground-floor retail. As proposed, Parcel 8 includes residential and hotel uses above ground-floor retail, thus the Applicant is requesting to modify the First-Stage PUD to add hotel use as an approved use on Parcel 8.

Second, site access along Maine Avenue has been improved. The locations of the intersections where new internal streets meet Maine Avenue are slightly different, and the location of the traffic signal for Phase 2 has been shifted from the Wharf street to the new roadway between Parcels 8 and 9 (the Stage 1 PUD had two traffic signals for Phase 2). Although there are slight changes, the overall access plan fits within the First-Stage access plan. The new location of the traffic signal is an improvement over the First-Stage plan because it is spaced more equally between adjacent intersections (and simplifies operations by removing one of the two proposed signals).

Transportation Elements of Phase 2

The transportation elements of Phase 2 fit within the Master Plan set in the First-Stage PUD. This includes a highly multi-modal design accommodating all modes of transportation.

As part of the development, the internal roadway network will be reconfigured. The existing site was auto-focused and included a parallel roadway to Maine Avenue, Water Street, which lead to a heavily-automobile designed transportation network and limited development. In contrast, The Wharf includes many modern transportation planning principles in its design, including multimodal shared internal streets, a cycletrack along Maine Avenue, a shuttle bus connection to metro, water taxi service, DDOT/WMATA bus service, Capital Bikeshare Stations, car sharing/ride sharing accommodations,

shared parking in underground garages, curb extensions and pedestrian improvements along Maine Avenue, and a robust Transportation Demand Management (TDM) plan.

Within the site, the Phase 2 of the development will result in new or improved sidewalks along the interior and perimeter of the site. This will be particularly impactful along Maine Avenue, where sidewalks do not meet DDOT standards and along the internal roadways of the site, where few pedestrian facilities currently exist. New pedestrian facilities are expected to meet or exceed DDOT requirements with an emphasis on pedestrian safety and comfort. 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 curb extensions and room for outdoor seating. In addition, the construction of parks, gathering places, consisting of both active and passive open spaces, piers, docks, plazas, and squares will further improve pedestrian connectivity. Pedestrians are seen as the primary users of The Wharf's internal streets, such that automobiles will travel at lower speeds and yield to pedestrians. The combination of low speeds and aesthetically-pleasing design elements creates a pedestrian environment that is safe, functional, and visually appealing.

Vehicular and loading access for Phase 2 will take place from a network of internal streets, accessed from Maine Avenue. Similar to Phase 1, Phase 2 includes Wharf Street, a shared space street adjacent to the water. In addition, a series of mews, alley-like streets, will connect Maine Avenue to parking and loading access points and Wharf Street. All internal roadways are designed to operate with all modes of traffic going at slow speeds.

Phase 2 will provide approximately 843 parking spaces in two below-grade parking garages. One below-grade parking garage will provide 499 parking spaces under Parcels 6, 7, and 8, and a second below-grade parking garage will provide 344 parking spaces under Parcels 9 and 10; parking is planned to be priced at the market-rate. This amount of parking is appropriate for an urban, multi-modal site. The location and design of The Wharf allow for such a reduction while still providing sufficient parking. A parking demand analysis, detailed within the report, shows that typical demand can be accommodated by on-site parking.



All major loading activity, including service dock access, will take place within internal streets. Some loading is planned curbside in front of building lobbies. No back-up maneuvers from Maine Avenue or other external streets will be necessary for trucks to access their loading docks. The loading facilities provided by Phase 2 of the development will be sufficient to accommodate expected loading demand.

The development will supply long-term bicycle parking within both garages of Phase 2, and short-term bicycle parking in and around the perimeter of the site. As part of Phase 2 of the Wharf, the Applicant will fund the relocation or installation of two (2) Capital Bikeshare stations. This is in addition to the three (3) Capital Bikeshare stations that the Applicant funded to be installed/relocated as part of Phase 1 of the Wharf. A total of four (4) Capital Bikeshare stations will be conveniently placed along Maine Avenue, with an additional Capital Bikeshare station near Waterfront Park. As the plan currently stands, the Capital Bikeshare stations are planned at the following locations:

1. Maine Avenue and Market Square
2. Maine Avenue and 9th Street
3. Maine Avenue and 7th Street
4. Maine Avenue and M Street Landing
5. Water Street and M Place

The Maine Avenue cycle track will extend from the Fish Market to Water Street, with the section from the Fish Market to 7th Street coinciding with Phase 1 and the section from 7th Street to Water Street planned as part of Phase 2. The cycle track will be 10-foot wide, bi-directional, and grade-separated.

Multi-Modal Impacts and Recommendations

Transit

The site is served by regional and local transit services via Metrobus and Metrorail. The site is 0.25 miles from the Waterfront Metrorail Station entrance at M Street and 4th Street, and 0.5 miles from the L'Enfant Metrorail Station entrance at D Street and 7th Street. Existing Metrobus stops are located near the site along M Street and 7th Street, and future Circulator and Metrobus stops are planned adjacent to the site on Maine Avenue.

Coinciding with the opening of Phase 1 of the Wharf, two (2) WMATA Metrobus routes (routes 52 and 74) and one Circulator

route are proposed to be re-routed to further increase transit connectivity.

Although the development will be generating new transit trips, existing transit facilities have enough capacity to handle the new trips.

Pedestrian

The site is surrounded by a 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. There are areas to the north of the site which lack buffers, curb ramps, or crosswalks that meet DDOT and ADA standards.

As a result of the development, pedestrian facilities along the perimeter of the site will be improved such that they meet or exceed DDOT requirements and provide an improved pedestrian environment.

Bicycle

The site has access to existing on- and off-street bicycle facilities. The Anacostia Riverwalk Trail, and bicycle lanes along 6th Street, I Street, and 4th Street near the site provide excellent connection to and from the site for those traveling by bicycle.

The Applicant will install a cycle track along Maine Avenue, extending from the Fish Market to Water Street, where shared-lane markings will link the new Maine Avenue cycle track to the Anacostia Riverwalk Trail, providing a publicly accessible amenity which will greatly improve bicycle connectivity in the area.

The development will supply long-term bicycle parking within both garages of Phase 2, and short-term bicycle parking in and around the perimeter of the site. The Applicant will also fund installation of four (4) Capital Bikeshare station along Maine Avenue and one (1) Capital Bikeshare station in Waterfront Park.

Vehicular

The proposed development is well-connected to regional roadways such as I-395, I-695, and I-295, primary and minor arterials such as South Capitol Street, M Street, and I Street, and an existing network of collector and local roadways.

In order to determine the potential impacts of the proposed development on the transportation network, this report



projects future conditions with and without development of the site and performs analyses of intersection delays and queues.

In completing the technical capacity analyses, this report noticed several overall trends. The growth in traffic volumes projected within the study area do not overlap where volumes were highest earlier this decade (i.e. compared to the traffic counts from the Stage 1 Traffic Study which were collected in 2010). There has been significant growth in volumes in the intervening years on other movements. This makes sense, as the regional traffic passing through the study area is generally going in different directions than the new local traffic serving the study area and nearby locations like the Capitol Riverfront. The end result are traffic volumes that are more bi-directional than before.

The majority of vehicular capacity concerns in the study area can be alleviated through signal timing changes that adapt of the changes in volume patterns, but at some locations, operational changes alone cannot mitigate the potential for future delays.

As has been stated in prior reports done throughout this area of the District, an essential component for good traffic operations in this area will be to minimize the vehicular trip generation of new development, thus reducing the overlap between new local traffic and regional traffic. The Wharf has been planned from the beginning to be a heavily multi-modal development with a low vehicular trip generation. Instead of investing in widening roadways to alleviate capacity concerns, the strategy has been to minimize volumes to avoid capacity problems. This is also because widening roadways of adding more vehicular capacity is not feasible nor desirable (due to the negative impact it can have on other modes).

As such, the multi-modal improvements described in this report are indirectly mitigating traffic operations impacts. One notable improvement is the new traffic signal at Marina Way and Maine Avenue. The new traffic signal provides a good location for Phase 2 traffic to enter on and off Maine Avenue. Based on the technical analysis results, the placement of the new traffic signal will have capacity benefits for the intersections of 9th, 7th and 6th Streets with Maine Avenue, as it will help avoid making any of these issues worse by limiting the amount of Phase 2 related traffic turning at those intersections.

In addition to these improvements, this report recommends DDOT review several mitigations measures for traffic operations:

- Adjusting signal timings throughout the study area to adapt to changes in volumes.
- Exploring creating a double-left turn southbound at 9th Street's approach to Maine Avenue.
- Restricting parking along Maine Avenue during the afternoon peak hour at its eastbound approach to 6th Street in order to create a short through/right turn lane.

The Applicant is willing to provide these improvements as part of its Zoning Order commitments, given DDOT agreement on their implementation.

Summary and Recommendations

This report concludes that **the proposed development will not have a detrimental impact on the surrounding transportation network assuming that the proposed site design elements are implemented.**

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

- The site's close proximity to Metrorail.
- The removal of existing internal roadways and subsequent replacing with new internal roadways provides an upgrade in the urban fabric of the network, fits future planning efforts, and significantly increases the site's porosity for all modes of travel.
- Parking is right-sized to demand, and can accommodate all demand on site while not encouraging driving as a mode
- The installation of a new signal at Marina Way and Maine Avenue. This new traffic signal will help distribute traffic bound to and from the site in a manner that alleviates existing issues at adjacent intersections. In addition, the installation of a new signal at Marina Way and Maine Avenue will provide another signalized pedestrian crossing point along Maine Avenue, significantly improving pedestrian infrastructure in the area.
- The inclusion of secure long-term bicycle parking spaces within the development that meet or exceed zoning requirements.



- The installation of short-term bicycle parking spaces around the perimeter of the site and in the garage, that meet or exceed zoning requirements.
- The creation of wide pedestrian sidewalks that meet or exceed DDOT and ADA requirements.
- The inclusion of publicly accessible plazas and parks, gathering places, consisting of both active and passive open spaces, piers, docks, plazas, and squares that improve pedestrian circulation.
- The installation of a grade-separated bi-directional cycle track along Maine Avenue.
- The installation of Shared Lane markings (“Sharrows”) along 6th Street, M Place, and Water Street, that will connect the Maine Avenue cycle track to the Anacostia Riverwalk Trail.
- The Applicant will fund the installation of two (2) new Capital Bikeshare stations, one (1) along Maine Avenue and one (1) near Waterfront Park.
- A robust Transportation Demand Management (TDM) plan that reduces the demand of single-occupancy, private vehicles during peak period travel times or shifts single-occupancy vehicular demand to off-peak periods.
- The Applicant has provided water taxi docks in Phase 1, and is working with providers to have them in place when Phase 1 opens.
- The Applicant coordinated with NPS and NCPC on pedestrian improvements to Banneker Park which include stairs and ADA accessible paths between Banneker Park and The Wharf. The Applicant has contributed significantly towards the construction of these improvements.



INTRODUCTION

PURPOSE OF STUDY

This report reviews the transportation elements of the Wharf Phase 2 development. The site, shown in Figure 1 and Figure 2, is located in the Southwest Waterfront neighborhood adjacent to the Wharf Phase 1 development on Maine Avenue in Southwest DC.

The purpose of this report is to:

1. Review the transportation elements of the development site plan and demonstrate that the site conforms to DDOT's general policies of promoting non-automobile modes of travel and sustainability.
2. Provide information to DDOT and other agencies on how the development of the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site on all major modes of travel and where these trips will be distributed on the network.
3. Determine if development of the site will lead to adverse impacts on the local transportation network. This report accomplishes this by projecting future conditions with and without development of the site and performing analyses of vehicular delays. These delays are compared to the acceptable levels of delay set by DDOT standards to determine if the site will negatively impact the study area. In those areas where adverse impacts are identified and require mitigation, the report provides recommendations for improvements to the transportation network to mitigate the adverse impacts.

PROJECT SUMMARY

Phase 2 of The Wharf includes Parcels 6 to 10, as well as three additional structures (the Water Buildings) that will include retail and Marina related space. The resulting development of Phase 2 of The Wharf will be a mixed-use development consisting of seven (7) buildings with a total of approximately 547,504 square feet of office space, 317 residential dwelling units, 119,059 square feet of retail, 116 hotel rooms, and 250 boat slips, as follows:

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- Water Building 1 will include approximately 11,033 square feet of retail and approximately 853 square feet of maritime support services.
- Water Building 2 will include approximately 13,050 square feet of retail and approximately 3,100 square feet of maritime support services.
- Water Building 3 will include approximately 5,175 square feet of maritime support services.
- Wharf Marina will include approximately 250 boat slips.

CONTENTS OF STUDY

This report contains nine sections as follows:

- Study Area Overview
This section reviews the area near and adjacent to the proposed project and includes an overview of the site location.
- Project Design
This section reviews the transportation components of the project, including the site plan and access. This chapter also contains the proposed Transportation Demand Management (TDM) plan for the site.
- Trip Generation
This section outlines the travel demand of the proposed project. It summarizes the proposed trip generation of the project.
- 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 project, including presenting mitigation measures for minimizing impacts as needed.

- Transit

This section summarizes the existing and future transit service adjacent to the site, reviews how the project's transit demand will be accommodated, outlines impacts, and presents recommendations as needed.

- Pedestrian Facilities

This section summarizes existing and future pedestrian access to the site, reviews walking routes to and from the project site, outlines impacts, and presents recommendations as needed.

- Bicycle Facilities

This section summarizes existing and future bicycle access to the site, reviews the quality of cycling routes to and from the project site, outlines impacts, and presents recommendations as needed.

- Safety/Crash Analysis

This section reviews the potential safety impacts of the project. This includes a review of crash data at intersections in the study area and a qualitative discussion on how the development 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

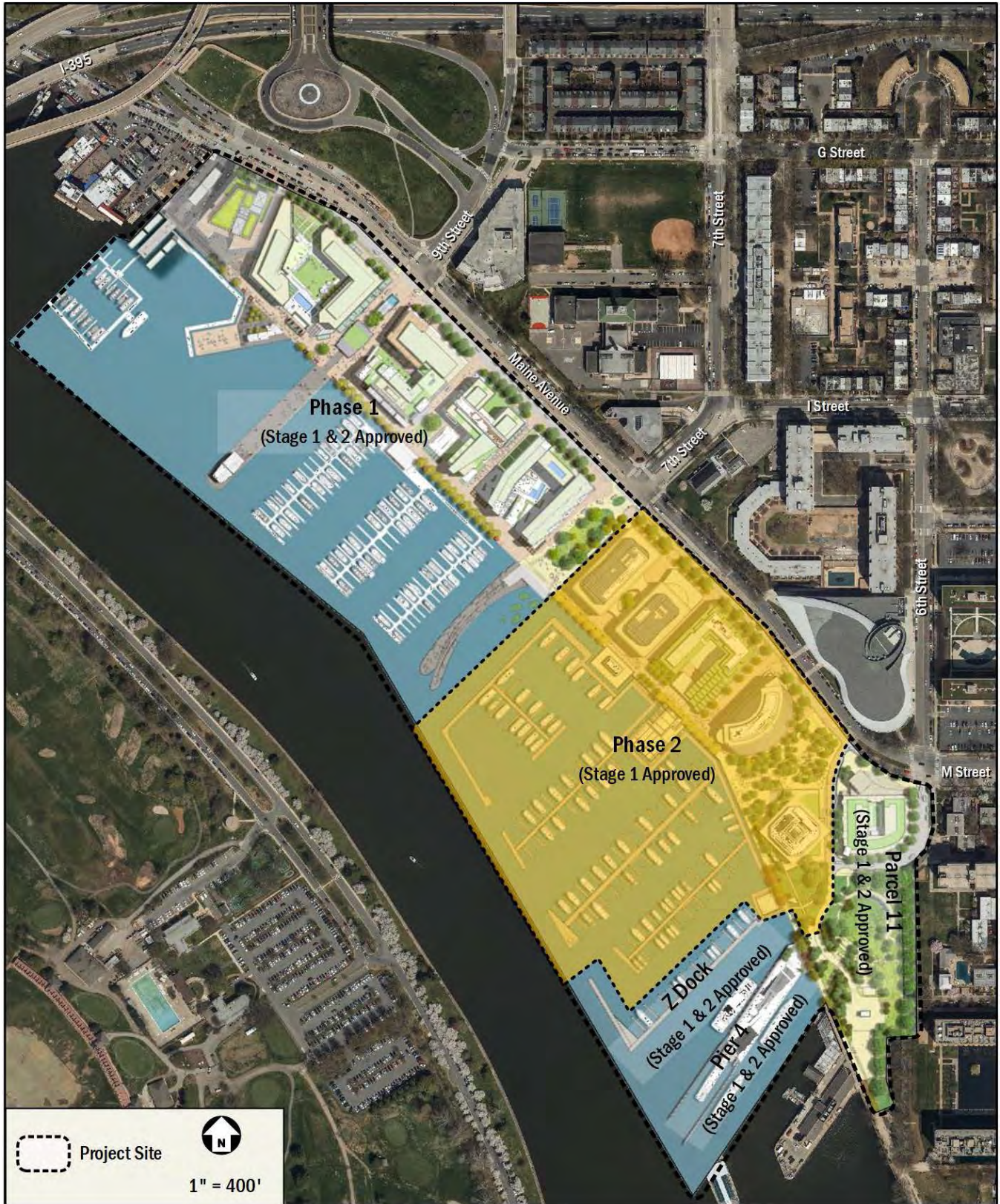


Figure 2: Site Aerial



STUDY AREA OVERVIEW

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

The following conclusions are reached within this chapter:

- The site is surrounded by an extensive regional and local transportation system that will connect the residents, employees, and patrons of the proposed development to the rest of the District and surrounding areas.
- The site is well-served by public transportation with access to five Metrorail lines, two local Metrobus lines and one regional commuter line.
- There is existing bicycle infrastructure including the bike trails along the southwest waterfront and several bike lanes and signed routes in the vicinity of the site.
- Pedestrian conditions are generally good, particularly along anticipated major walking routes.

MAJOR TRANSPORTATION FEATURES

Overview of Regional Access

The Wharf Phase 2 site has ample access to regional vehicular- and transit-based transportation options, as shown in Figure 4, that connect the site to destinations within the District, Virginia, and Maryland.

The site is accessible from several interstates such as I-395, I-695, and I-295. These connect to several US highways such as US-50 (New York Avenue), and US-1. The highways and interstates create connectivity to the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs. All of these roadways bring vehicular traffic within half-mile of the site, at which point arterials and local roads can be used to access the site directly.

There are several local bus routes near the site that connect the site with various areas in Washington, DC. The site is also serviced by one regional commuter bus (OmniRide) which connects to Prince William County, Virginia. The multiple bus route options allow for more frequent bus pickups and specified travel destination options, as shown in Figure 5.

The site is located 0.25 miles from the Waterfront Metrorail station, which is serviced by the Green line which provides connection to areas in the District and Maryland. The Green line connects the District core to areas in Prince George's County, Maryland. In addition, the Green line connects with the Yellow, Orange, Blue, and Silver lines at the nearby L'Enfant Plaza station, and with the Red line at the Gallery Place station. These connections create access to the site throughout areas in the District, Virginia, and Maryland that are near Metrorail.

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

Overview of Local Access

There are several local transportation options near the site that serve vehicular, transit, walking, and cycling trips, as shown on Figure 5.

The site is served by a local vehicular network that includes several principal and minor arterials such as M Street, I Street, 7th Street, and Maine Avenue. In addition, there is an existing network of connector and local roadways that provide access to the site.

The Metrobus system provides local transit service in the vicinity of the site, including connections to several neighborhoods within the District and additional Metrorail stations. As shown in Figure 5, there are two bus routes that service the site. In the vicinity of the site, the majority of Metrobus routes travel along 7th Street and M Street. These bus routes connect the site to many areas of the District. A detailed review of transit stops within a quarter-mile walk of the site is provided in a later section of this report. Proposed changes to a number of WMATA and Circulator routes have been proposed which would extend service to the site. Those proposed changes are discussed in the transit section of the report.

There are existing bicycle facilities that connect the site to areas within the District, most notably the I Street, 6th Street, and 4th Street bike lanes which provide connections to the Downtown and other bicycle facilities. South of the site the Anacostia Riverwalk Trail is primarily off-street, but other areas require users to travel along signed routes throughout the roadway network. Other facilities include bicycle-friendly roads along Water Street and P Street.



As shown in Figure 3, the site is situated in a neighborhood that encompasses good walkscores and bikescores. The site is in an area that provides a better walking environment than areas to the south which observe barriers such as the Anacostia River. A detailed review of existing and proposed pedestrian access and infrastructure is provided in a later section of this report.

Overall, the Wharf Phase 2 site is surrounded by a good local transportation network that allows for efficient transportation options via transit, bicycle, walking, or vehicular modes.

Car-sharing

Three car-sharing 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 two car-share locations with four (4) total vehicles within a quarter-mile of the site. These locations are listed in Table 1.

Car-sharing 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.

Walkscore

Walkscore.com is a website that provides scores and rankings for the walking, biking, and transit conditions within neighborhoods of the District. Based on this website the planned development is located in the Southwest Waterfront neighborhood. The site location has a walk score of 74 (or “Very Walkable”), a transit score of 75 (or “Excellent Transit”), and a bike score of 82 (or “Very Bikeable”). Figure 3 shows the neighborhood borders in relation to the site location and displays a heat map for walkability and bikeability.

The site is situated in an area with good walk scores because of the abundance of neighborhood serving retail locations that are in close proximity, where most errands can be completed by walking.

The excellent transit score was based on the proximity to multiple bus lines, and distance to the nearest Metrorail stop which is located 0.25 miles from the site.

The site is situated in an area with good bike scores due to its proximity to low volume residential roadways, number of bike lanes and trails, and flat topography.

Overall, the Southwest Waterfront neighborhood has high walk, transit, and bike scores. Additionally, the opening of Phase 1 of the Wharf and other planned developments and roadway improvements will help increase the walk, bike, and transit scores in the Southwest Waterfront neighborhood.

Table 1: Car-share within 0.25 miles of the Site

Carshare Location	Number of Vehicles
Zipcar	
4 th Street & I Street SW	2 vehicles
I Street & Makemie Place SW	2 vehicles
Total	4 vehicles

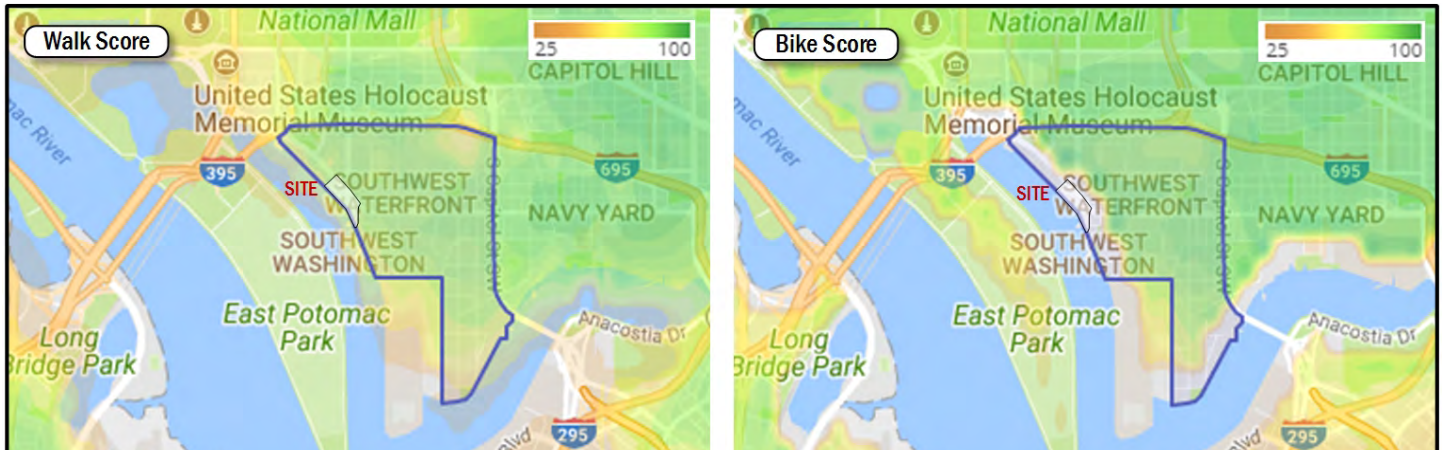


Figure 3: Summary of Walkscore and Bikescore

FUTURE PROJECTS

There are a few District initiatives and approved developments located in the vicinity of the site. 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 transit and bicycle improvements such as a Streetcar route and new bicycle trails and cycle

tracks. These recommendations would create additional multi-modal capacity and connectivity to the proposed development.

SustainableDC: Sustainable DC Plan

SustainableDC is planning effort initiated by the Department of Energy & Environment and the Office of Planning that provides the District with a framework for 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.

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.

Southwest Ecodistrict Initiative

Launched in 2009, the Southwest Ecodistrict Initiative is an effort to improve the isolated federal precinct, bounded by Independence Avenue to the north, Maine Avenue to the south, 12th Street to the west, and 4th Street to the east; the area comprises about 110 acres of private and public land. With the aim of transforming into a highly sustainable workplace and livable neighborhood, the key objectives of the initiative are:

- To reduce the environmental footprint of the area
- Create a destination for visitors and residents of the District
- Establish a diverse mix of uses, including cultural, housing, retail, and open space
- Remove visual and physical barriers between the National Mall and the southwest waterfront
- Improve walkability
- Expand transit capacity; and
- Use the limited financial resources to improve buildings and infrastructure in the area.

The study is led by the National Capitol Planning Commission, and is split into three phases. Phase 1 is mostly concerned with the study and strategy phases of the plan. Phase 2 focuses on the development and financing strategies that will be used. Phase 3 involves the development, NEPA, design, engineering, and construction. The whole process is expected to span up until 2030.



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.

Planned Developments

There are 26 potential development projects in the vicinity of the Wharf Phase 2 site, all of which were considered as part of this CTR. For the purpose of the technical capacity analysis and consistent with DDOT and industry standards, only approved developments expected to be complete prior to the planned development with an origin/destination within the study area were included. A detailed list of the background developments considered and a description of their applicability for incorporation in the study is included in the Technical Appendix. Of the background developments considered, seven (7) were ultimately included and are described below. Figure 6 shows the location of these developments in relation to the proposed development. Please note that other developments not meeting these criteria are considered accounted for in technical capacity analysis using the background growth rate (see Traffic Operations Chapter).

The Wharf Phase 1

Phase 1 of the Wharf is currently under construction. It is a large mixed-use development with retail, residential, office, hotel, and event uses. The development lies within the study area and is located adjacent to the Wharf Phase 2 development. It is expected to be completed in 2017 and thus will be included in the analysis.

680 Eye Street SW

This development consists of the conversion of the Riverside Baptist Church located at 680 Eye Street SW into a luxury 173-unit multi-family apartment building with ground floor retail. The development lies within the study area and has an

expected completion date of 2018, and thus will be included in the analysis.

The View at Waterfront

This development consists of residential and retail uses and is located on the northeast corner of 6th and M Streets SW. The development lies within the study area and has an expected completion date of 2018, and thus will be included in the analysis.

1001 4th Street SW

This development is one of the last phases of the Waterfront Station development and will be a mixed-use building located at 1001 4th Street SW. The building consists of an 11-story apartment building with below grade parking and bike storage, as well as ground floor retail and 12 townhouses, totaling to 365 dwelling units. This development lies within the study area and has already opened. It was assumed that 1001 4th Street SW was not fully leased at the time data was collected and was included in the analysis as part of a conservative assumption of traffic.

1000 4th Street SW

This development is part of Waterfront Station and consists of 443 apartments (133 of them will be affordable housing), 22,500 square feet of retail, and a 10,000 square-foot black box theater. It is located on 1000 4th Street SW. This development lies within the study area and has an expected completion date of 2022, and thus will be included in the analysis.

375 M Street SW

One of two mixed-use developments located at 425 and 375 M Street SW. The East building (375 M) will consist of 309 dwelling units, 21,930 square feet of retail, and 18,660 square feet of commercial space. This development lies within the study area and has an expected completion date of 2020, and thus will be included in the analysis.

425 M Street SW

One of two mixed-use developments located at 425 and 375 M Street SW. The West building (425 M) will consist of 296 dwelling units, 19,940 square feet of retail, and 19,450 square feet of commercial space. This development lies within the study area and has an expected completion date of 2020, and thus will be included in the analysis.



301 M Street SW

This development consists of 187 residential units and is located at 301 M Street SW, on the northwest corner of 3rd and M Streets SW. The development lies within the study area and has an expected completion date of 2017, and thus will be included in the analysis.

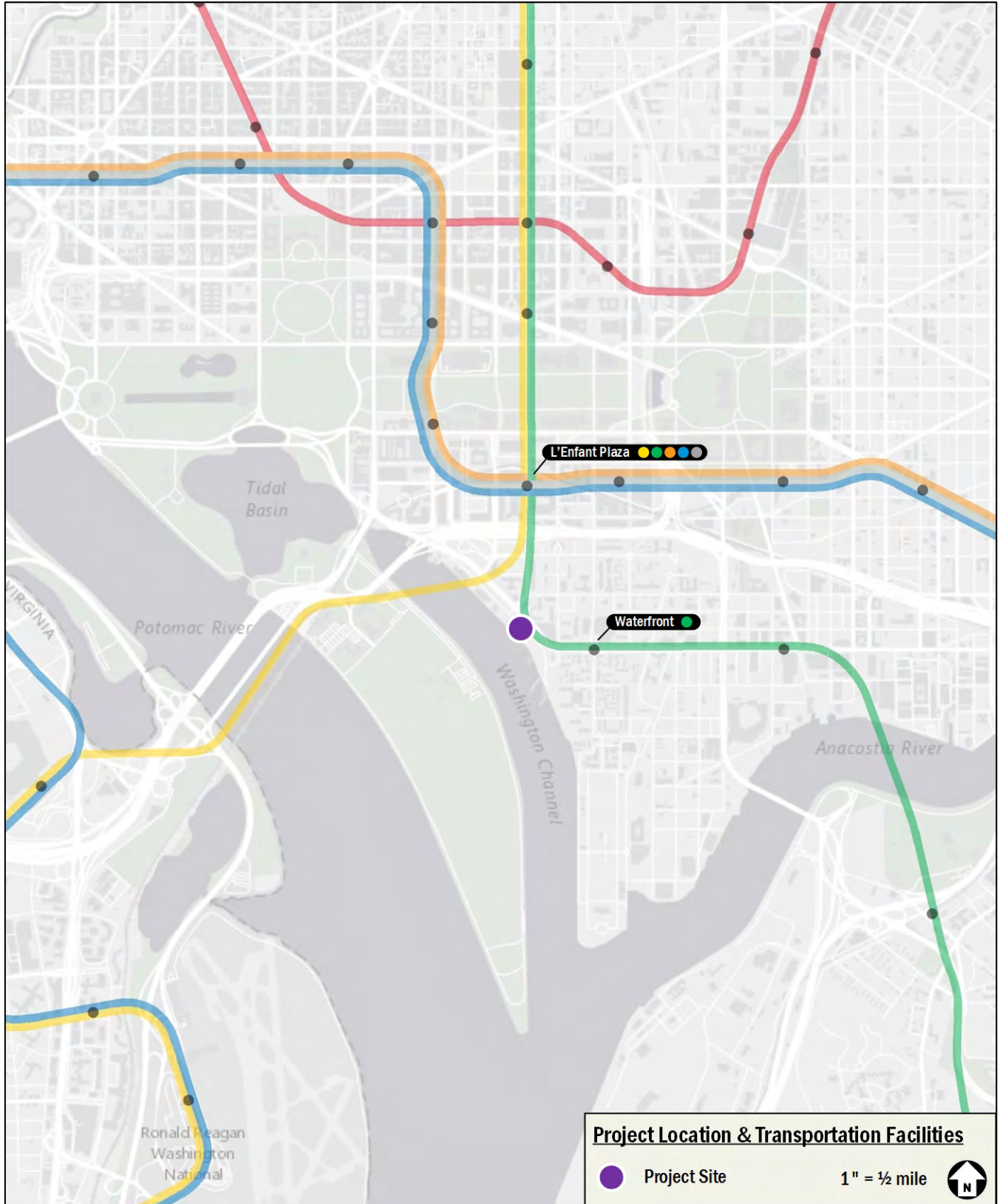


Figure 4: Major Regional Transportation Facilities

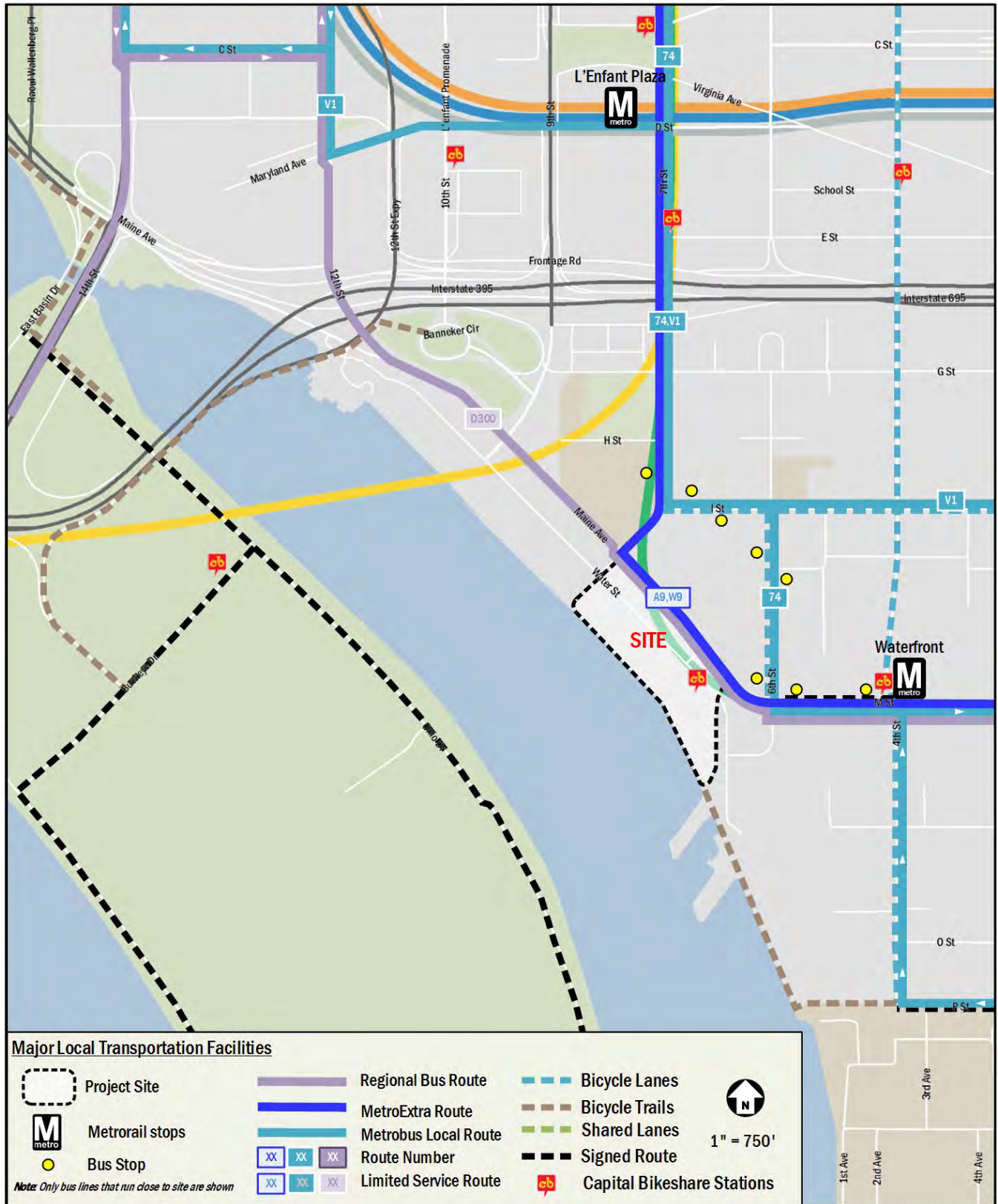


Figure 5: Major Local Transportation Facilities

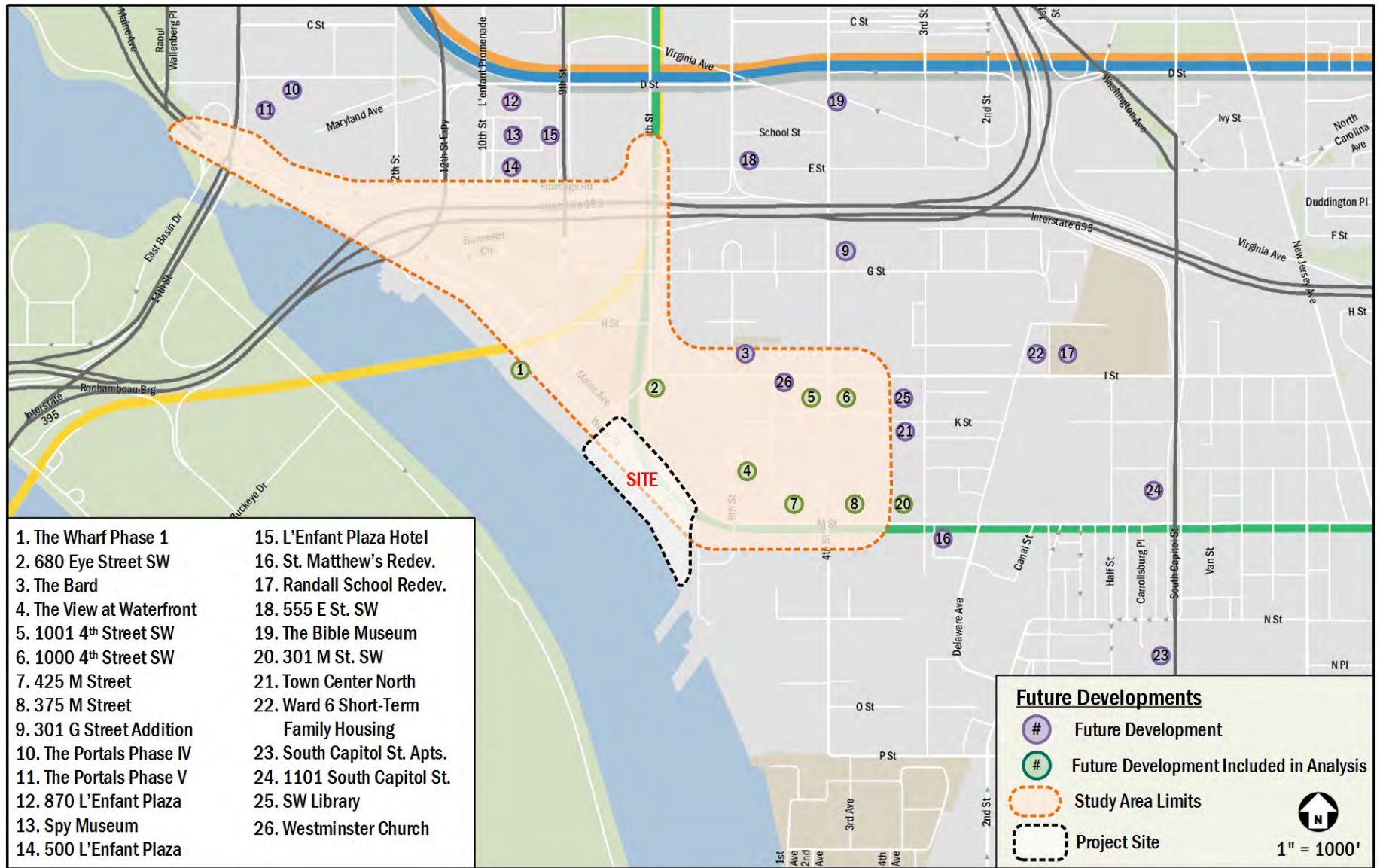


Figure 6: Planned Development Map



PROJECT DESIGN

This section reviews the transportation components of Phase 2 of the Wharf development, including the proposed site plan and access points. It includes descriptions of the site's vehicular access, loading, parking, bicycle and pedestrian facilities, and Transportation Demand Management (TDM) plan. It supplements the information provided in the site's plan package dated May 23, 2017 that accompanied the Zoning Application, which includes several illustrations of site circulation and layout.

As shown in Figure 7, Phase 2 of The Wharf includes Parcels 6 to 10, as well as three additional structures (the Water Buildings) that will include retail and Marina related space. The resulting development of Phase 2 of The Wharf will be a mixed-use development consisting of seven (7) buildings with a total of 547,504 square feet of office space, 317 residential dwelling units, 119,059 square feet of retail, 116 hotel rooms, and 250 boat slips, as follows:

- Parcel 6 of the development will include approximately 275,049 square feet of office space and approximately 16,866 square feet of retail.
- Parcel 7 of the development will include approximately 212,312 square feet of office space and approximately 19,543 square feet of retail.
- Parcel 8 of the development will include approximately 235 residential dwelling units, approximately 26,316 square feet of retail, and approximately 116 hotel rooms.
- Parcel 9 of the development will include approximately 82 residential condo dwelling units and approximately 16,080 square feet of retail.
- Parcel 10 of the development will include approximately 60,143 square feet of office space and approximately 16,171 square feet of retail.
- Water Building 1 will include approximately 11,033 square feet of retail and approximately 853 square feet of maritime support services.
- Water Building 2 will include approximately 13,050 square feet of retail and approximately 3,100 square feet of maritime support services.
- Water Building 3 will include approximately 5,175 square feet of maritime support services.
- Wharf Marina will include approximately 250 boat slips.

Figure 8 shows the development program for Phase 2 of the Wharf.

PARCEL OVERVIEW

Parcel 6

Located on the western-most parcel of Phase 2, directly east of the 7th Street Park, Parcel 6 is planned as a mixed-use building that includes:

- 275,049 square feet of office space;
- 16,866 square feet of retail;
- 499 vehicular parking spaces in a below-grade parking garage (shared with Parcels 7 and 8);
- At least 208 secure long-term bicycle parking spaces located in the below-grade parking garage and 57 short-term bicycle parking spaces located in the below-grade parking garage and at grade (shared with Parcel 7); and
- A loading area with one (1) 30' truck berths, and one (1) service and delivery space to be shared by all uses. Parcel 6 will also have the flexibility for some retail tenants to load directly from the shared streets.

Parcel 6 will front Maine Avenue. Pedestrian access to the office component of the Parcel 6 will be from 7th Street Park and from the north-south pedestrian thoroughfare separating Parcel 6 and Parcel 7. Pedestrian access to the ground-floor retail will be from all sides of Parcel 6, including from an east-west "covered alley" that permits pedestrian circulation. The covered alley divides the ground floor into two components, creating a retail pavilion along the Wharf that can be accessed on all four sides. Vehicular and bicycle access to the below-grade parking garage and bicycle parking will take place on the eastern edge of Parcel 7 off an internal roadway (The Alley). In addition, a vehicular drop-off and pick-up area which will provide limited access to the Parcel 6 loading facilities and internal curbside loading, separates Parcel 6 and Parcel 7.

Access to the on-site loading facilities for Parcel 6 will be along the portion of the east-west service thoroughfare between 7th Street Park and the north-south pedestrian thoroughfare, with trucks arriving and departing the Parcel 6 loading area via the 7th Street Park.

Figure 9 shows the ground-floor plan and the planned access points for Parcel 6.



Parcel 7

Located directly east of Parcel 6, Parcel 7 is bounded by Maine Avenue to the north, an internal north-south roadway to the east (The Alley), Wharf Street to the south, and a north-south pedestrian thoroughfare and vehicular drop-off and pick-up/loading access area to the west. Parcel 7 is planned as a mixed-use building that includes:

- 212,312 square feet of office space;
- 19,543 square feet of retail;
- 499 vehicular parking spaces in a below-grade parking garage (shared with Parcels 6 and 8);
- At least 208 secure long-term bicycle parking spaces located in the below-grade parking garage and 57 short-term bicycle parking spaces located in the below-grade parking garage and at grade (shared with Parcel 6); and
- A loading area with two (2) 30' truck berths, and one (1) curbside service and delivery space to be shared by all uses. Parcel 7 will also have the flexibility for some retail tenants to load directly from the shared streets.

Pedestrian access to the office component of Parcel 7 will be from the north-south pedestrian thoroughfare separating Parcel 6 and Parcel 7. Pedestrian access to the ground-floor retail will be from all sides of Parcel 7. Similar to Parcel 6, an east-west "covered alley" that permits pedestrian circulation, divides the ground floor into two components, creating a retail pavilion along the Wharf that can be accessed on all four sides.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will take place on the eastern edge of Parcel 7 off an internal roadway (The Alley). In addition, a vehicular drop-off and pick-up area separates Parcel 6 and Parcel 7.

Access to the on-site loading facilities for Parcel 7 will be on the eastern edge of Parcel 7 off an internal roadway (The Alley), with trucks arriving and departing via The Alley.

Figure 9 shows the ground-floor plan and planned access points for Parcel 7.

Parcel 8

Located directly east of Parcel 7, Parcel 8 is bounded by Maine Avenue to the north, an internal north-south roadway to the east (Marina Way), Wharf Street to the south, and an internal north-south roadway to the west (The Alley). Parcel 8 is planned as a mixed-use building that includes:

- 235 residential dwelling units;
- 26,316 square feet of retail;
- 116 hotel rooms;
- 499 vehicular parking spaces in a below-grade parking garage (shared with Parcels 6 and 7);
- 247 secure long-term bicycle parking spaces located in the below-grade parking garage and 37 short-term bicycle parking spaces located in the below-grade parking garage and at grade; and
- A hotel loading area with one (1) 30' truck berth, a loading area for the residential and retail components of Parcel 8 with three (3) 30' truck berths, and three (3) curbside service and delivery spaces to be shared by all uses. Parcel 8 will also have the flexibility for some retail tenants to load directly from the shared streets.

Pedestrian access to the residential component of Parcel 8 will be from an internal east-west alley (Water Street) that will permit pedestrian and vehicular circulation, similar to Parcel 6 and Parcel 7. The alley divides the ground floor into two components, creating a retail pavilion along the Wharf that can be accessed on all four sides. Pedestrian access to the retail component of Parcel 8 will be from all sides of Parcel 8. Pedestrian access to the hotel component will be on the southwest corner of Parcel 8, where The Alley and Water Street intersect.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will take place on the eastern edge of Parcel 8 off an internal roadway (Marina Way). In addition, a 40-foot vehicular drop-off and pick-up area for the residential component of Parcel 8 will be in front of the residential lobby on Water Street. Another 40-foot valet area for the hotel component of Parcel 8 will be in front of the hotel lobby on Water Street.

Access to the on-site loading facilities for Parcel 8 will be on the western edge of Parcel 8, off an internal roadway (The Alley) which separates Parcels 7 and 8, with trucks arriving and departing via The Alley.

Figure 10 shows the ground-floor plan and planned access points for Parcel 8.

Parcel 9

Located directly east of Parcel 8, Parcel 9 is bounded by Maine Avenue to the north, an internal north-south roadway to the east and south (Wharf Street), and an internal north-south



roadway to the west (Marina Way). Parcel 9 is planned as a mixed-use building that includes:

- 82 residential condo dwelling units;
- 16,080 square feet of retail;
- 344 vehicular parking spaces in a below-grade parking garage (shared with Parcel 10);
- At least 99 secure long-term bicycle parking spaces located in the below-grade parking garage and 13 short-term bicycle parking spaces located in the below-grade parking garage and at grade; and
- A loading area with two (2) 30' truck berths, and one (1) curbside service and delivery space to be shared by all uses. Parcel 9 will also have the flexibility for some retail tenants to load directly from the shared streets.

Pedestrian access to the residential component of Parcel 9 will be along the eastern side of the building, on Wharf Street. The exact location of the pedestrian entrances to the ground-floor retail has not been determined as of yet.

Vehicular access to the below-grade parking garage will take place along the eastern edge of Parcel 9 via two car lifts, which will be attended. Usage of the lifts is exclusive to residents of the 82 residential condo units in Parcel 9. Bicycle access to bicycle parking in the below-grade parking garage will either take place via the garage ramp of Parcel 10, or via the elevators in the lobby of Parcel 9.

Access to the on-site loading facilities for Parcel 9 will be on the western edge of Parcel 9, off an internal north-south roadway (Marina Way), with trucks arriving and departing via Marina Way.

Figure 11 shows the ground floor plan and planned access points for Parcel 9.

Parcel 10

Located at the eastern edge of M Street Landing (the plaza separating Parcel 9 and 10), Parcel 10 is bounded by M Street Landing to the north and west, Water Street to the east, and The Terrace (a park) to the south. Parcel 10 is planned as a mixed-use building that includes:

- 60,143 square feet of office space;
- 16,171 square feet of retail;
- 344 vehicular parking spaces in a below-grade parking garage (shared with Parcels 9);

- At least 28 secure long-term bicycle parking spaces located in the below-grade parking garage and 11 short-term bicycle parking spaces located in the below-grade parking garage and at grade; and
- A loading area with one (1) 30' truck berth, and one (1) curbside service and delivery space to be shared by all uses.

Pedestrian access to the office component of Parcel 10 will be on the southeastern corner of the building, on Water Street. The exact location of the pedestrian entrances to the ground-floor retail have yet to be determined.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will take place on the eastern edge of Parcel 10 off an internal roadway (Water Street).

Access to the on-site loading facilities for Parcel 10 will be from the eastern edge of Parcel 10, off an internal roadway (Water Street), with trucks arriving and departing via Water Street.

Figure 12 shows the ground floor plan and planned access points for Parcel 10.

Water Building 1

Water Building 1 is located along the waterside of the Wharf promenade (Wharf Street) and adjacent to the Parcel 6. Water Building 1 is planned as a mixed-use building that includes:

- 11,033 square feet of retail space;
- 853 square feet of maritime support services;
- 499 vehicular parking spaces in a below-grade parking garage (shared with Parcels 6, 7, and 8)
- At least three (3) secure long-term bicycle parking spaces located in the below-grade parking garage and three (3) short-term bicycle parking spaces located in the below-grade parking garage and at grade; and
- Curbside loading area to be shared by all uses.

Pedestrian access to the retail and maritime service components of Water Building 1 will primarily be on Wharf Street.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will be via the Parcel 7 or Parcel 8 garage ramps as detailed previously.



Water Building 1 is not required to provide loading facilities by Zoning; However, it is expected that loading activities will take place adjacent to Water Building 1 on Wharf Street.

Figure 13 shows the ground floor plan and planned access points for Water Building 1.

Water Building 2

Water Building 2 is located along the waterside of the Wharf promenade (Wharf Street) and adjacent to the Parcel 9. Water Building 2 is planned as a mixed-use building that includes:

- 13,050 square feet of retail space;
- 3,100 square feet of maritime support services;
- 499 vehicular parking spaces in a below-grade parking garage (shared with Parcels 6, 7, and 8)
- At least three (3) secure long-term bicycle parking spaces located in the below-grade parking garage and four (4) short-term bicycle parking spaces located in the below-grade parking garage and at grade; and
- Curbside loading area to be shared by all uses.

Pedestrian access to the retail and maritime service components of Water Building 2 will primarily be on Wharf Street.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will be via the Parcel 7 or Parcel 8 garage ramps as detailed previously.

Water Building 2 is not required to provide loading facilities by Zoning; However, it is expected that loading activities will take place adjacent to Water Building 2 on Wharf Street.

Figure 14 shows the ground floor plan and planned access points for Water Building 2.

Water Building 3

Water Building 3 is located along the waterside of the Wharf promenade just north of Pier 4 and adjacent to the Parcel 10. Water Building 3 is planned primarily for the use of liveaboard slip license holders and non-profit groups using the Wharf Marina. Water Building 3 includes:

- 5,175 square feet of maritime support services;
- 344 vehicular parking spaces in a below-grade parking garage (shared with Parcels 9 and 8)

- No bicycle parking will specifically be allocated for Water Building 3; however, there will be short-term bicycle parking located nearby in Waterfront Park and M Street Landing; and
- Curbside loading area to be shared by all uses.

Pedestrian access to Water Building 3 will primarily be via a stairway and gangplank off of the Wharf promenade.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will be via the Parcel 10 garage ramp as detailed previously.

Water Building 3 is not required to provide loading facilities by Zoning; However, it is expected that loading activities will take place near Water Building 3 on Water Street.

Figure 15 shows the ground floor plan and planned access points for Water Building 3.

Wharf Marina

As part of the Phase 2 PUD, the Applicant will construct new marina docks and piers. The proposed waterside infrastructure will be constructed between the 7th Street Recreational Pier and Pier 4, thus completing the construction of Wharf Marina.

The Wharf Marina will be comprised of 250 boat slips, 94 boat slips of which are used by live-aboard slip license agreement holders and 156 boat slips of which are used for recreational, transient, commercial, or non-profit uses.

Pedestrian access to the Wharf Marina will be along Wharf Street and M Street Landing.

Vehicular and bicycle access to the below-grade parking garage and bicycle parking will be via any of the Phase 2 garage access points at Parcels 7, 8, or 10.

The Wharf Marina is not required to provide loading facilities by Zoning; However, it is expected that loading activities will take place adjacent the Wharf Marina along Wharf Street.

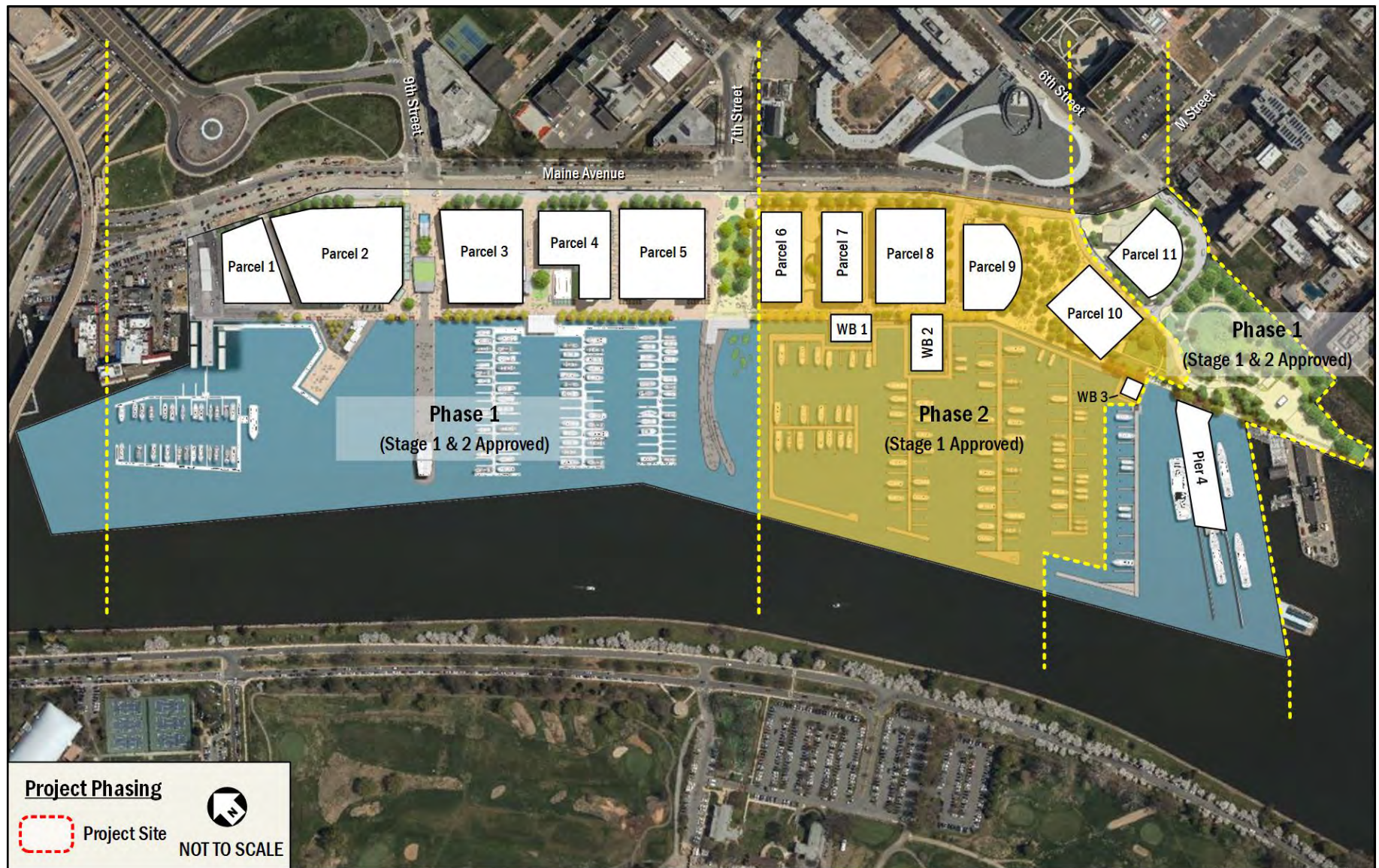


Figure 7: Project Phasing

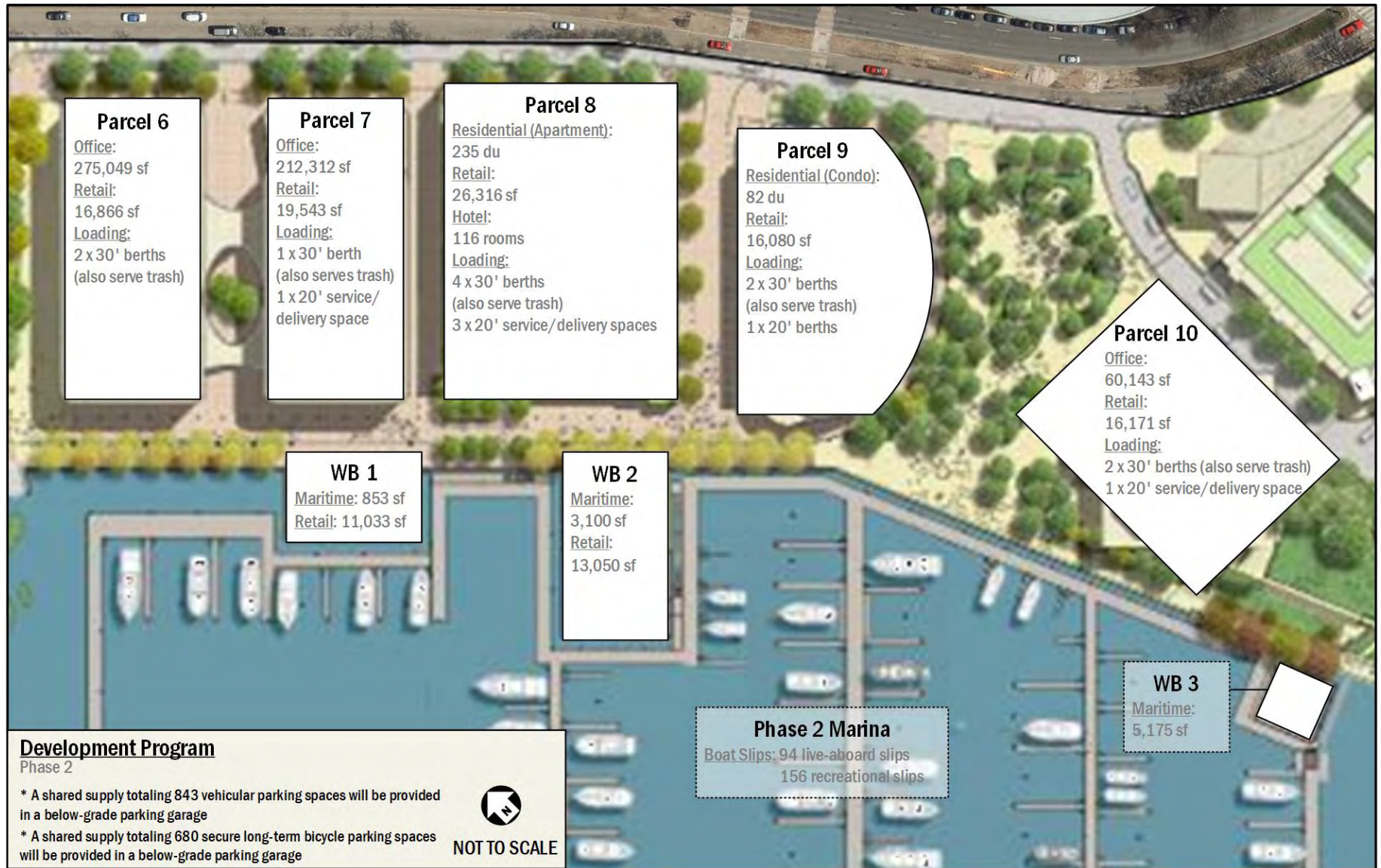


Figure 8: Phase 2 Development Program

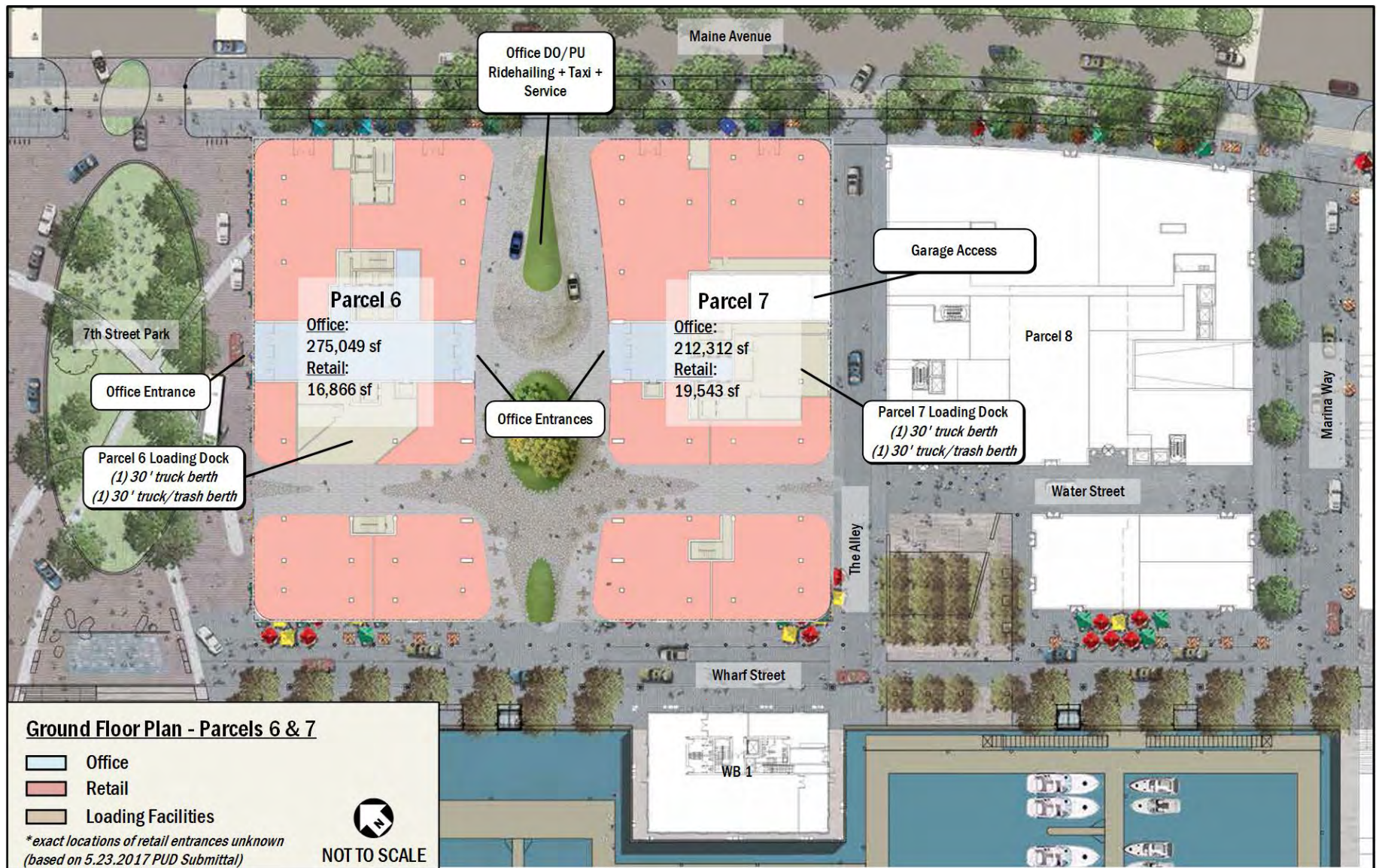


Figure 9: Ground Floor Plan – Parcels 6 and 7

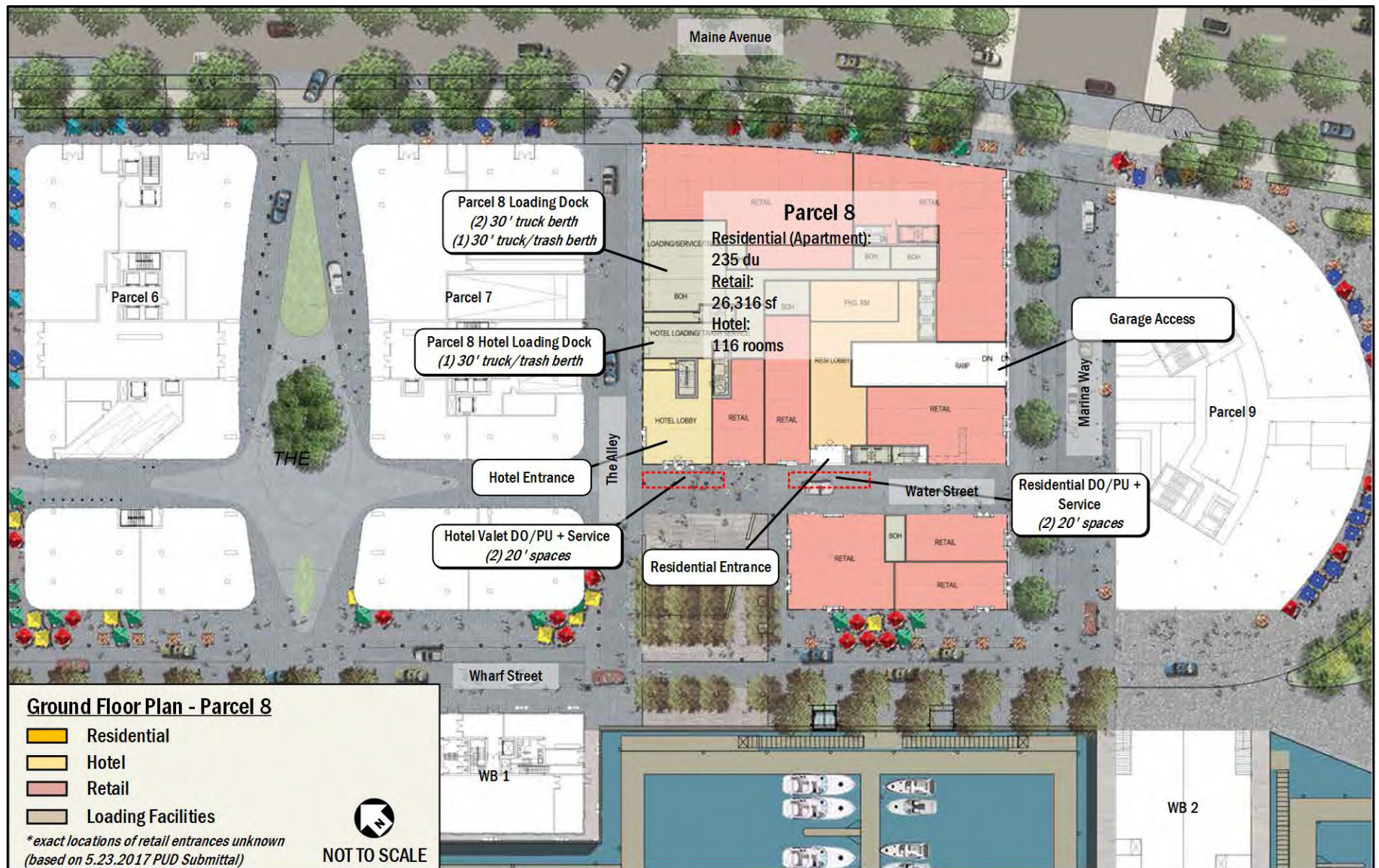


Figure 10: Ground Floor Plan – Parcel 8

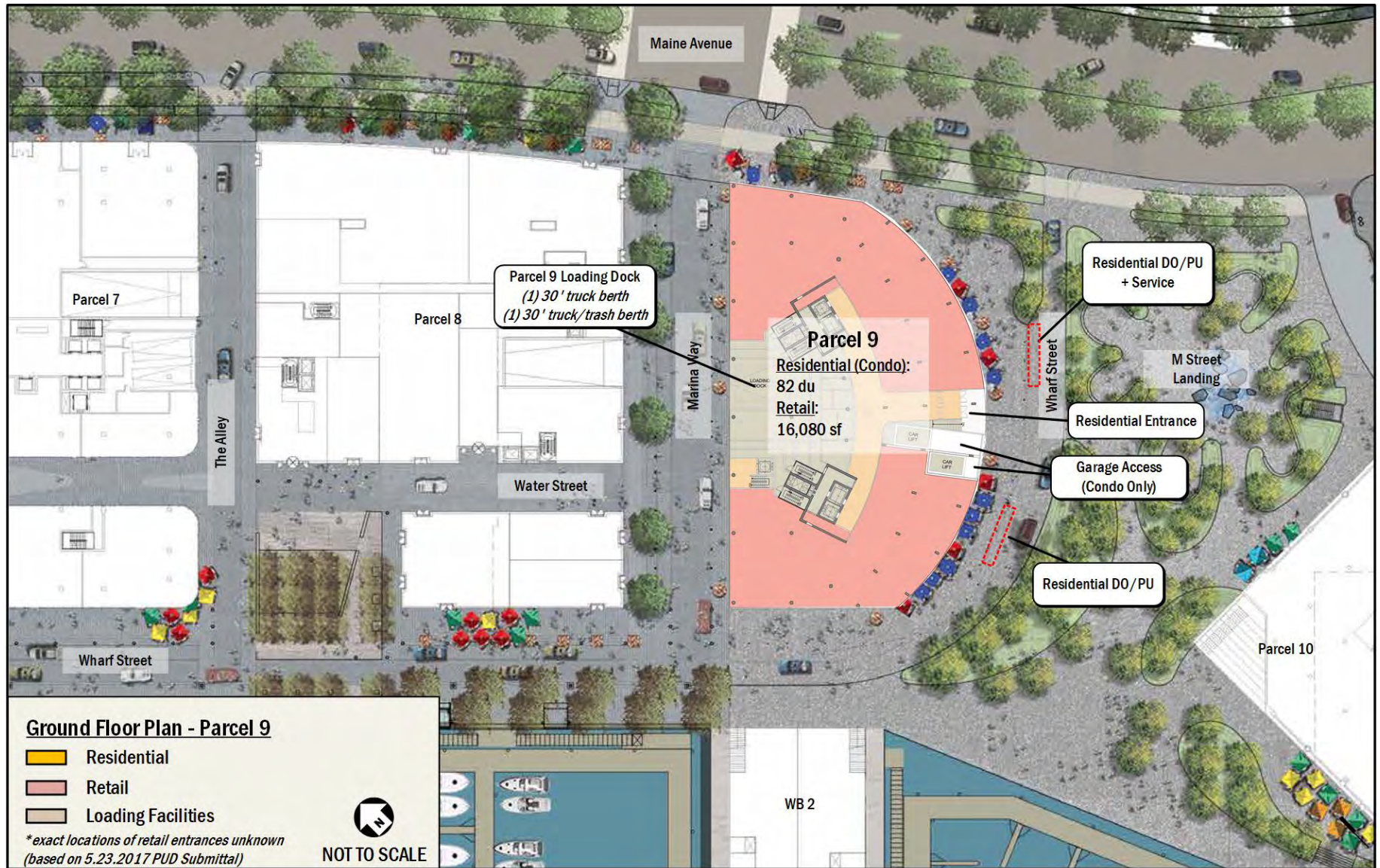


Figure 11: Ground Floor Plan – Parcel 9

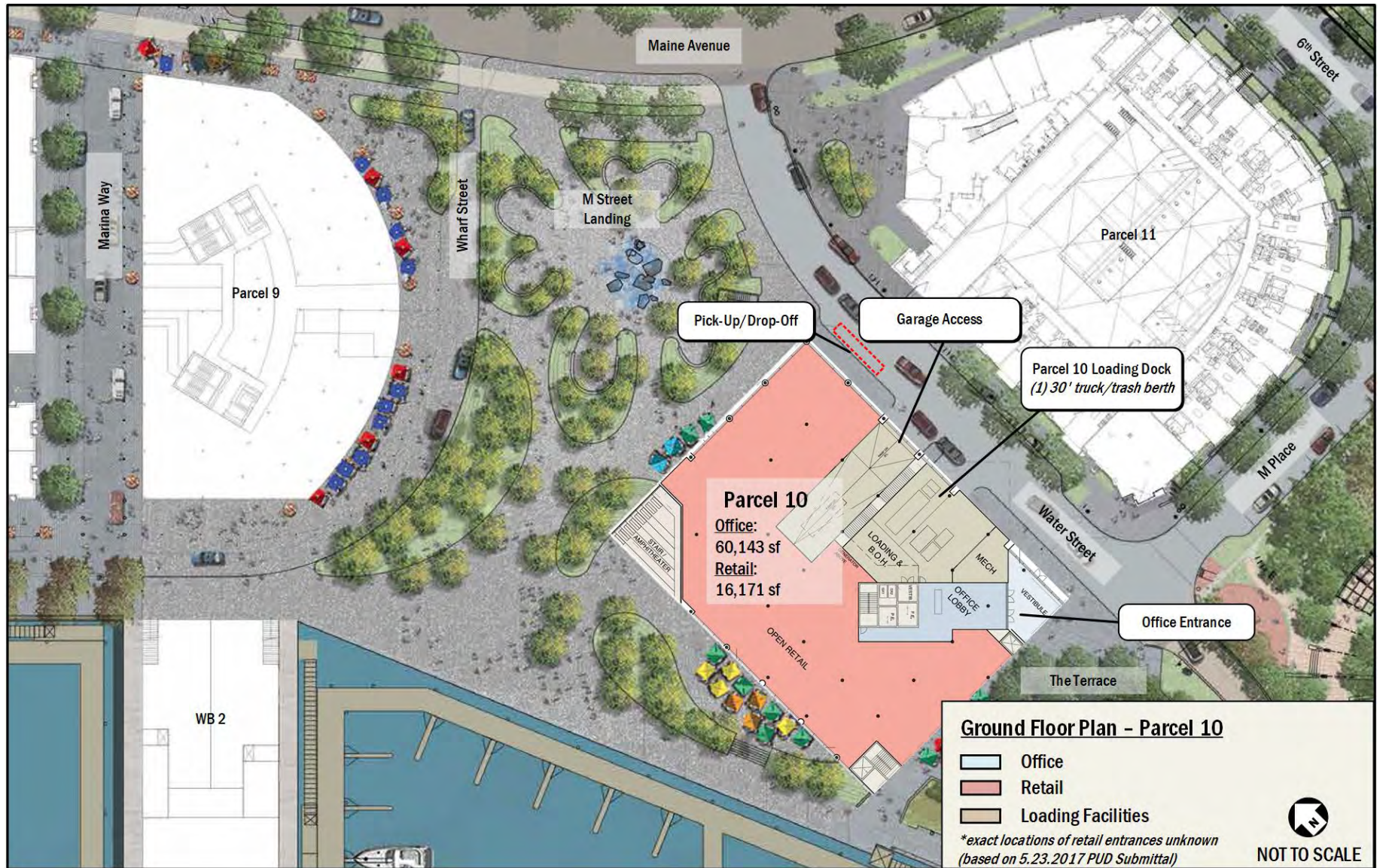


Figure 12: Ground Floor Plan – Parcel 10



Figure 13: Ground Floor Plan – Water Building 1

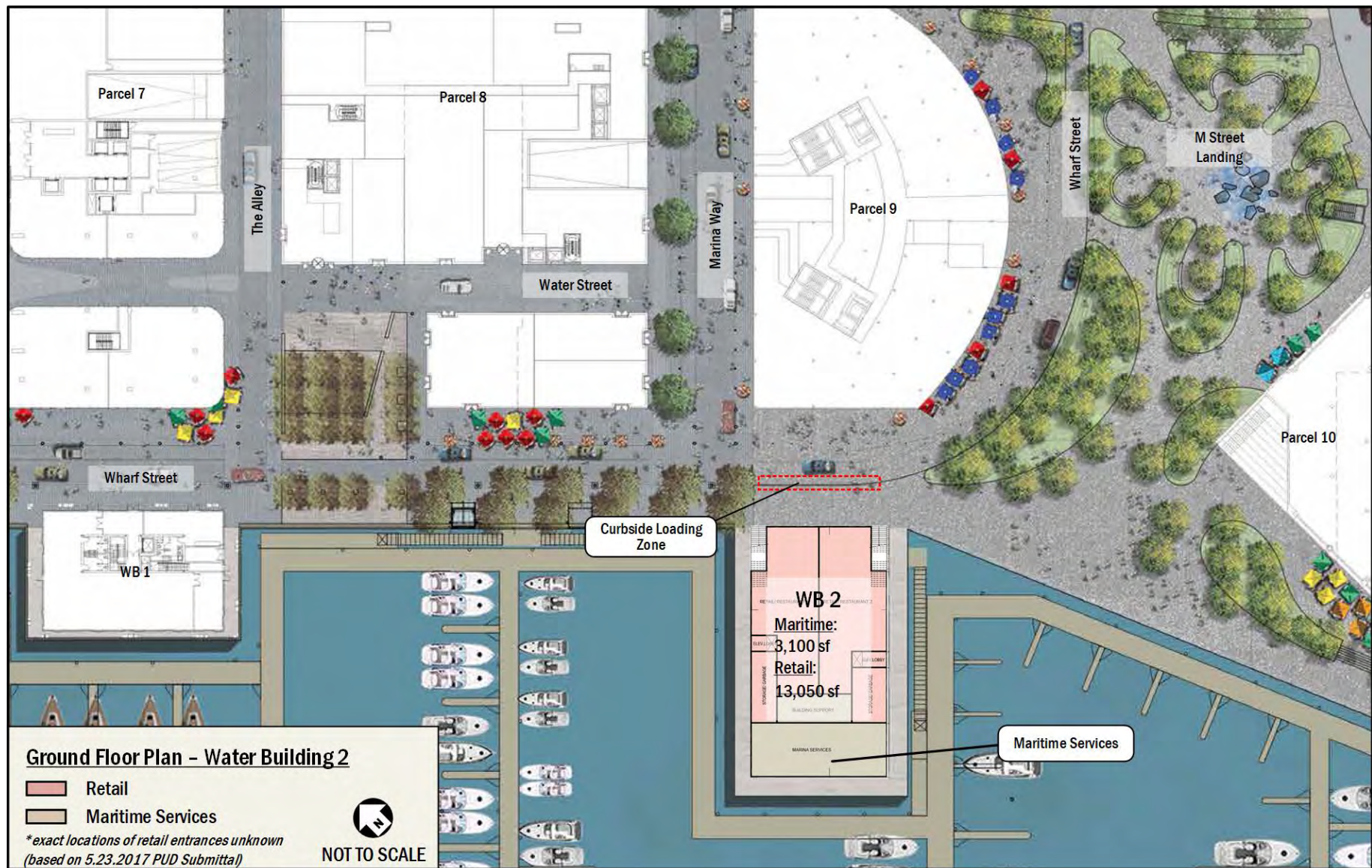


Figure 14: Ground Floor Plan – Water Building 2



Figure 15: Ground Floor Plan – Water Building 3



OPEN SPACES AND THOROUGHFARES

As one of the amenities of the project, the Applicant has proposed to provide certain public-use piers, public parks, open spaces, and other public spaces or infrastructure. This section details these different amenities:

M Street Landing

M Street landing will be an approximately 1.8-acre plaza that anchors the eastern gateway into the redeveloped Southwest Waterfront. Located between Parcels 9 and 10, and abutting Maine Avenue, M Street Landing will contain several seating areas, a Capital Bikeshare station, short-term bicycle parking, and café seating. Figure 16 shows the illustrative plan for M Street Landing.

The Grove

The Grove is an open space located adjacent to Wharf Street, within a plaza defined by the Parcel 7 retail pavilion on the west, and the hotel entrance and retail pavilion of Parcel 8 on the north and east, respectively. The Grove is planned to contain general outdoor seating and dining seating of adjacent restaurants. Figure 17 shows the illustrative plan for The Grove.

The Terrace

The Terrace is an open space located between Parcel 10 and Waterfront Park. The Terrace and its associated raised lawn area will help transition from the more active urban parks, plazas, and buildings along the Wharf, to the more passive Waterfront Park and existing residential neighborhoods to the southwest. The Terrace will include outdoor seating for the public and an elevator connecting to the below-grade parking garage. In addition, outdoor seating and dining areas for the ground-floor retail of Parcel 10 are planned. Figure 18 shows the illustrative plan for The Terrace.

Wharf Street

Consistent with the First-Stage PUD and subsequent approvals, Wharf Street will be, first and foremost, a pedestrian environment adjacent to Washington Channel, that also can operate to allow for low-speed, low-volume vehicular access to business fronts, restaurants, elderly and disabled passenger drop off, and valet parking along the water's edge. Wharf Street will be a flexible environment that can be closed periodically for special events and certain nights and weekends to emphasize and enhance the pedestrian experience while still maintaining emergency access.

The continuation of Wharf Street from 7th Street Park to M Street Landing will be constructed as part of the Phase 2 PUD, which will follow the same design pattern of Wharf Street that have already been approved and are under construction. Wharf Street is approximately a 60-foot wide, curbsless "shared space" that uses non-traditional traffic calming measures to limit vehicular speed, provide a safe pedestrian environment, and create a seamless and flexible space that is highly adaptable. Such measures include use of a variety of hardscape elements and street fixtures such as planters, bollards, seating, light fixtures, trees, and railings; differentiating paving patterns and textures; flush curbs, water features, and other methods to designate pedestrian-only zones from shared zones. Phase 2 of the Wharf will contain a continuous pedestrian zone that is provided along its entire length, and will be programmed to safely mix pedestrian uses, vehicular uses, and commercial uses such as kiosks and café zones. Figure 19 shows the typical cross-section and design elements that can be expected along Wharf Street as part of the Phase 2 PUD.

Maine Avenue

As part of the Phase 2 PUD, Maine Avenue between 7th Street and Water Street will be reconstructed consistent with the streetscape design that has been approved, with the exception that the buildings along Maine Avenue included in Phase 2 have been set back an additional five feet compared to those included in Phase 1 to provide even greater sidewalk width. As described in the First-Stage PUD, Maine Avenue along the Wharf redevelopment is envisioned to be an urban, tree-lined boulevard that provides generous pedestrian circulation space; accommodates multiple modes of transportation; and provides safe and convenient loading and curbside management. Consistent with the buildings that have been previously approved and are under construction, the buildings within the Phase 2 PUD having frontage along Maine Avenue are set back from the property line approximately 15 feet to allow for a generous sidewalk, planting zone, and a ten-foot wide, bi-directional, grade-separated cycle track. Figure 20 shows the typical cross-section and design elements that can be expected along Maine Avenue as part of the Phase 2 PUD.

The Mews

The internal roadways between and within buildings on Parcels 6, 7, and 8 are designed as private mews street or alleys. These connectors will not only provide primary entrances for access to parking and loading/service areas, but are also intended to be low-speed, curbsless pedestrian-dominated environments.



These internal roadways that are oriented perpendicular to Maine Avenue (The Alley, Marina Way, and a short section of Wharf Street), provide a small-scale street grid within Phase 2 of the Wharf, and increase site porosity. The internal roadways that are parallel to the Washington Channel and Maine Avenue, and run through Parcels 6, 7, and 8, provide additional options for circulation through the Phase 2 site.

These internal roadways will be designed to be flexible in nature and may at times facilitate vehicular access and loading, and at other times be primarily pedestrian in nature and filled with café tables and spill-over retail, or special events. Loading facilities and vehicular/bicycle parking garage entries are primarily provided off of the mews; however, these private rights-of-way have been carefully designed to provide adequate vehicular circulation space while minimizing the aesthetic and experiential impact on the pedestrian experience within the mews. Figure 21 shows the typical cross-section and design elements of Marina Way. Figure 22 shows the typical cross-section of Water Street and The Alley



Figure 16: M Street Landing

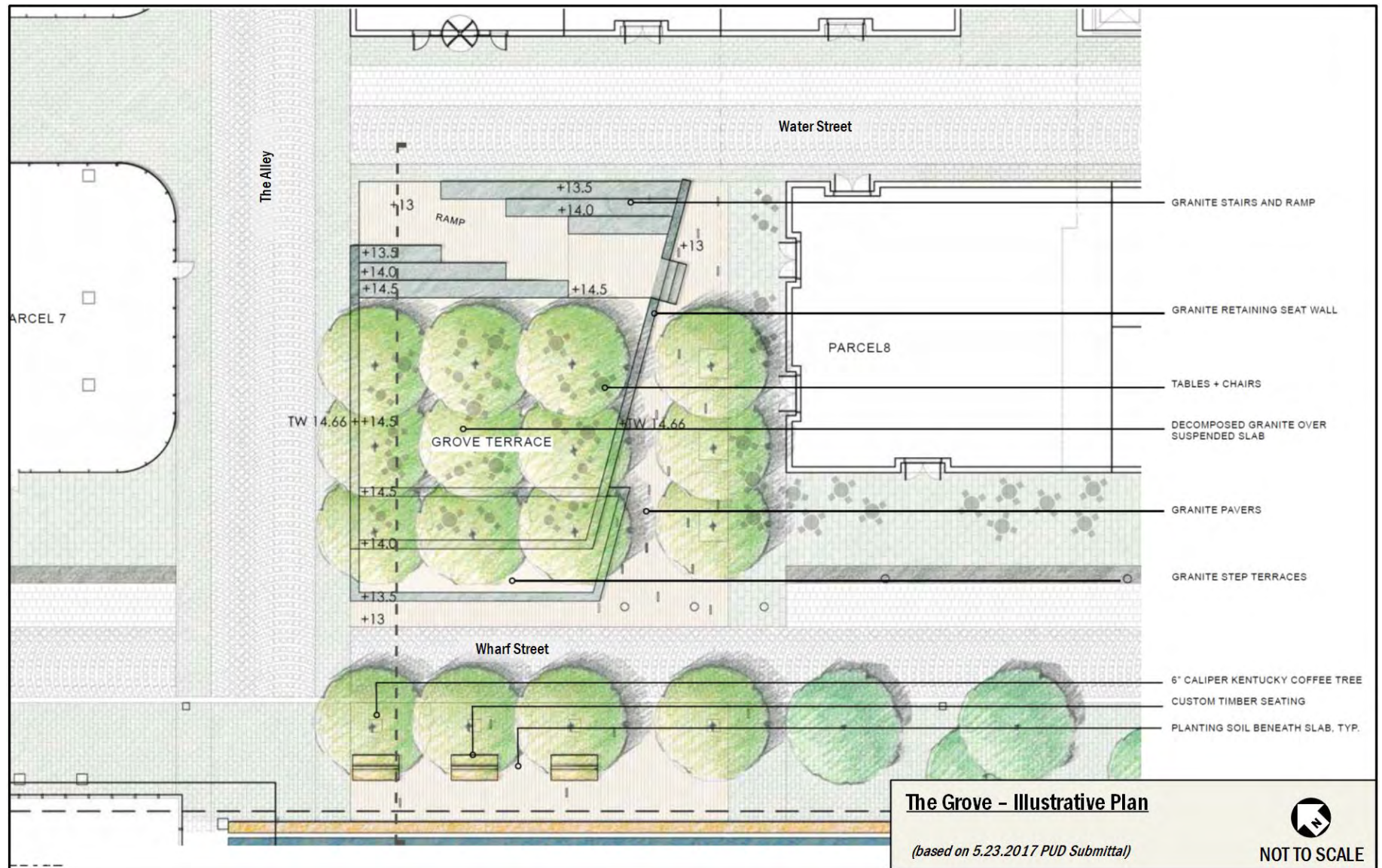


Figure 17: The Grove

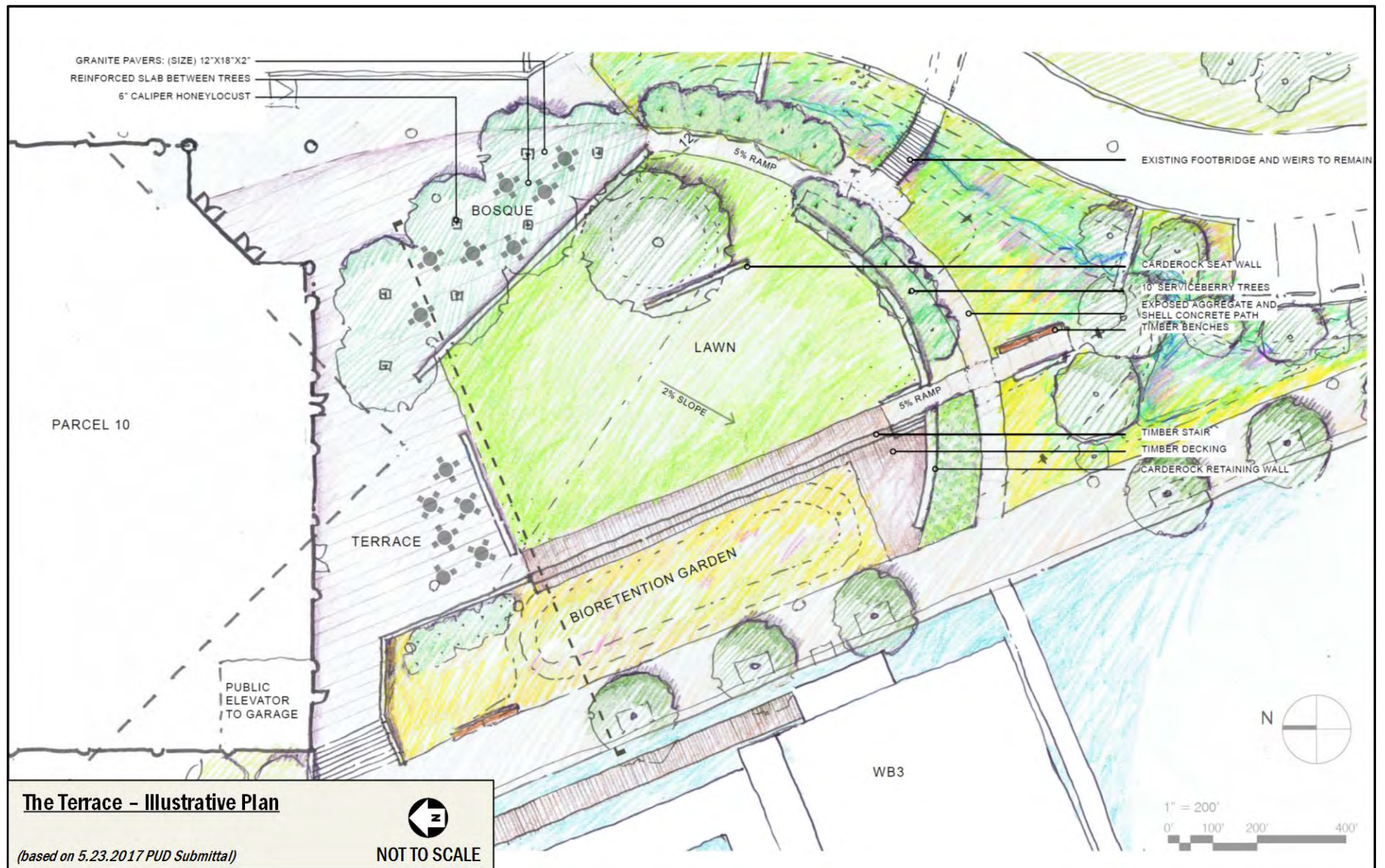


Figure 18: The Terrace

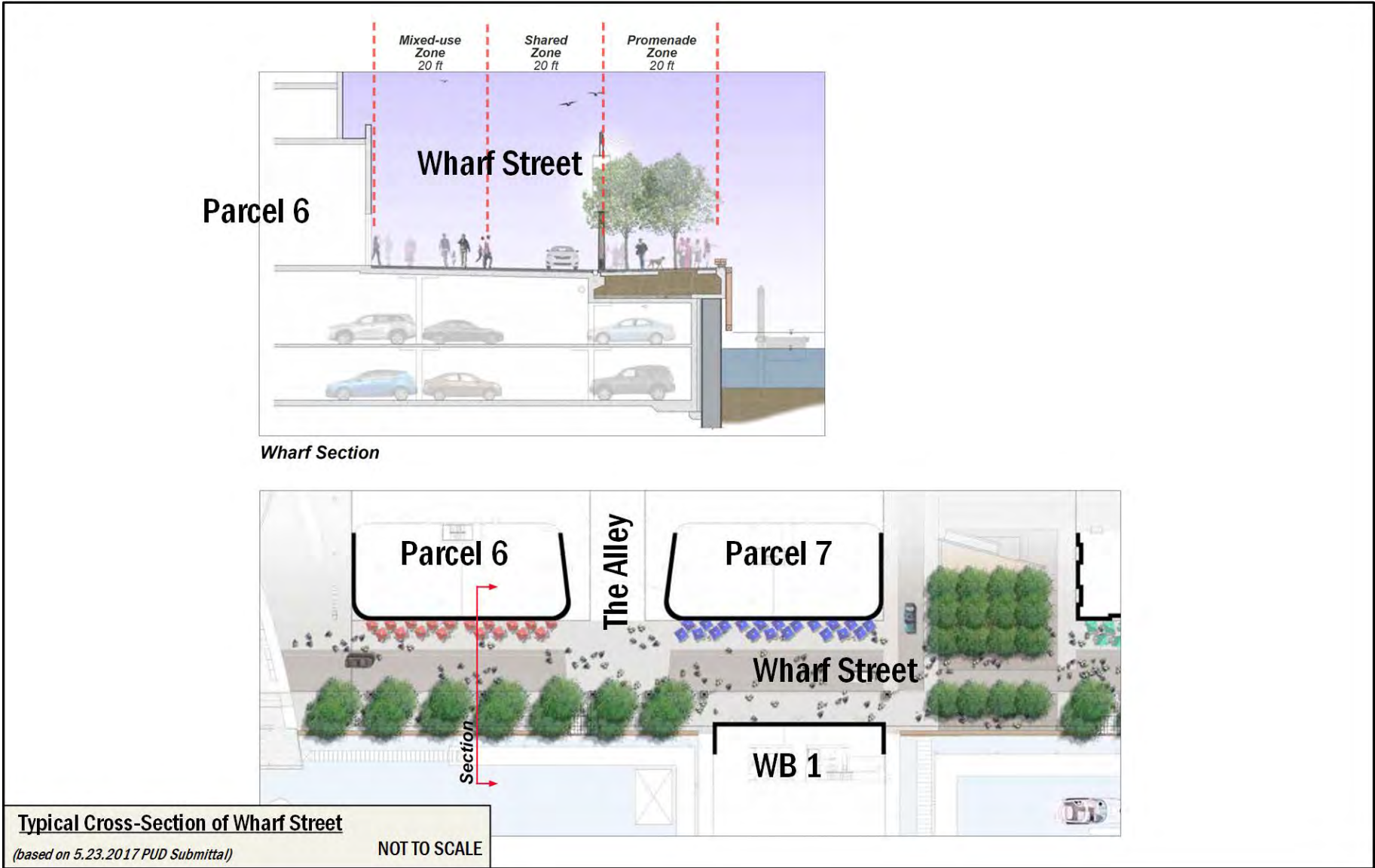


Figure 19: Typical Cross-Section of Wharf Street

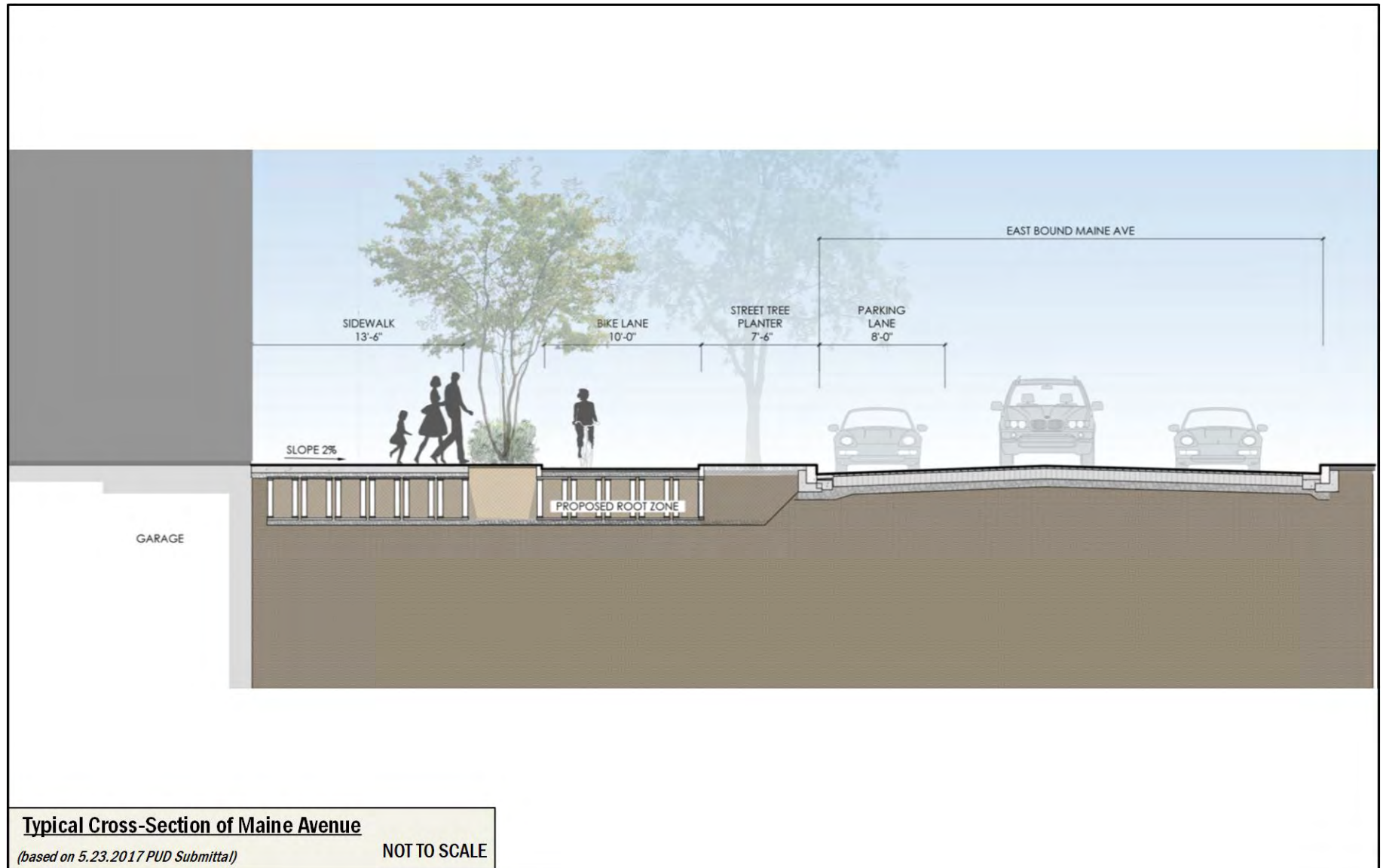


Figure 20: Typical Cross-Section of Maine Avenue

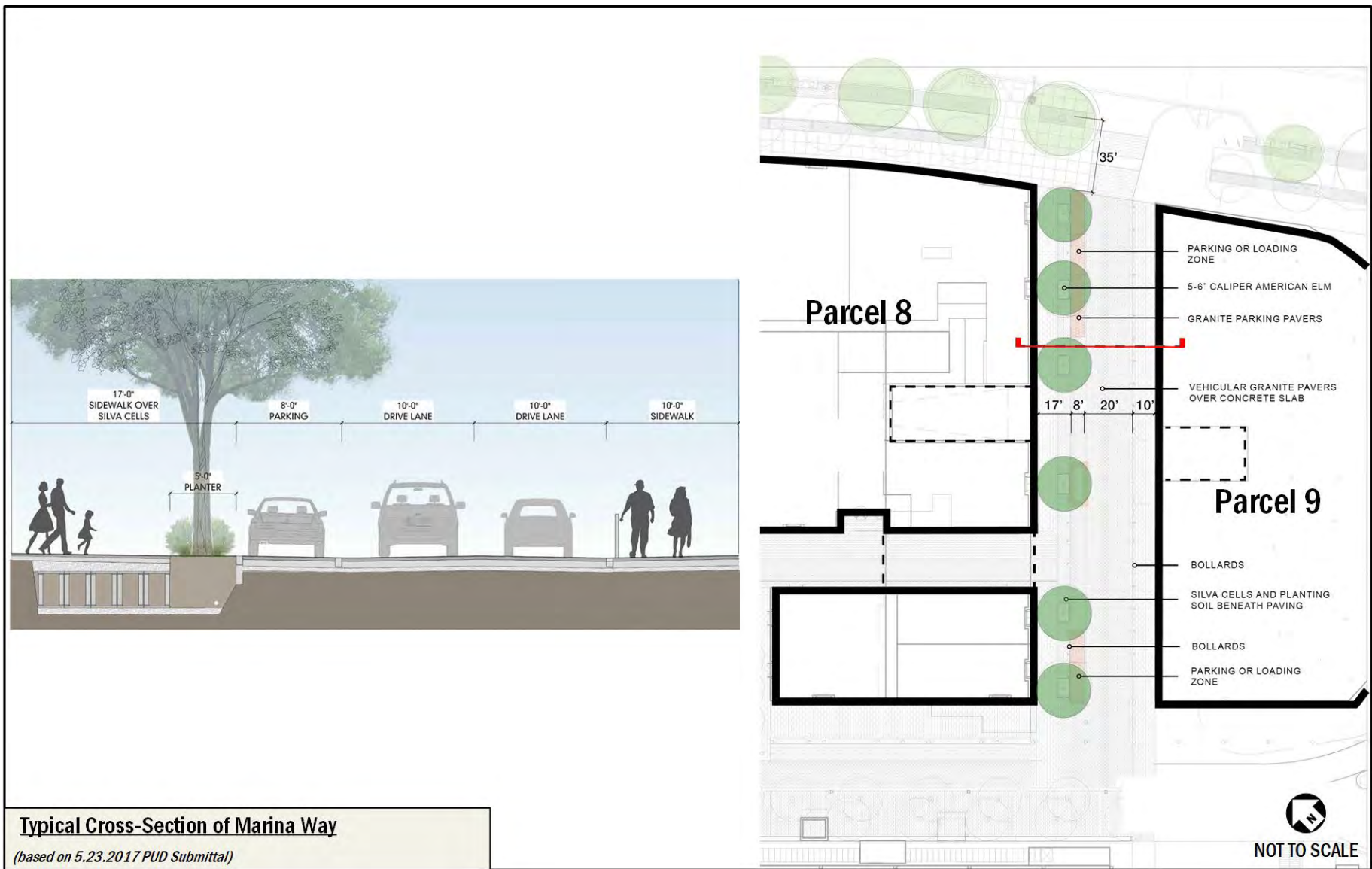


Figure 21: Typical Cross-Section of Marina Way

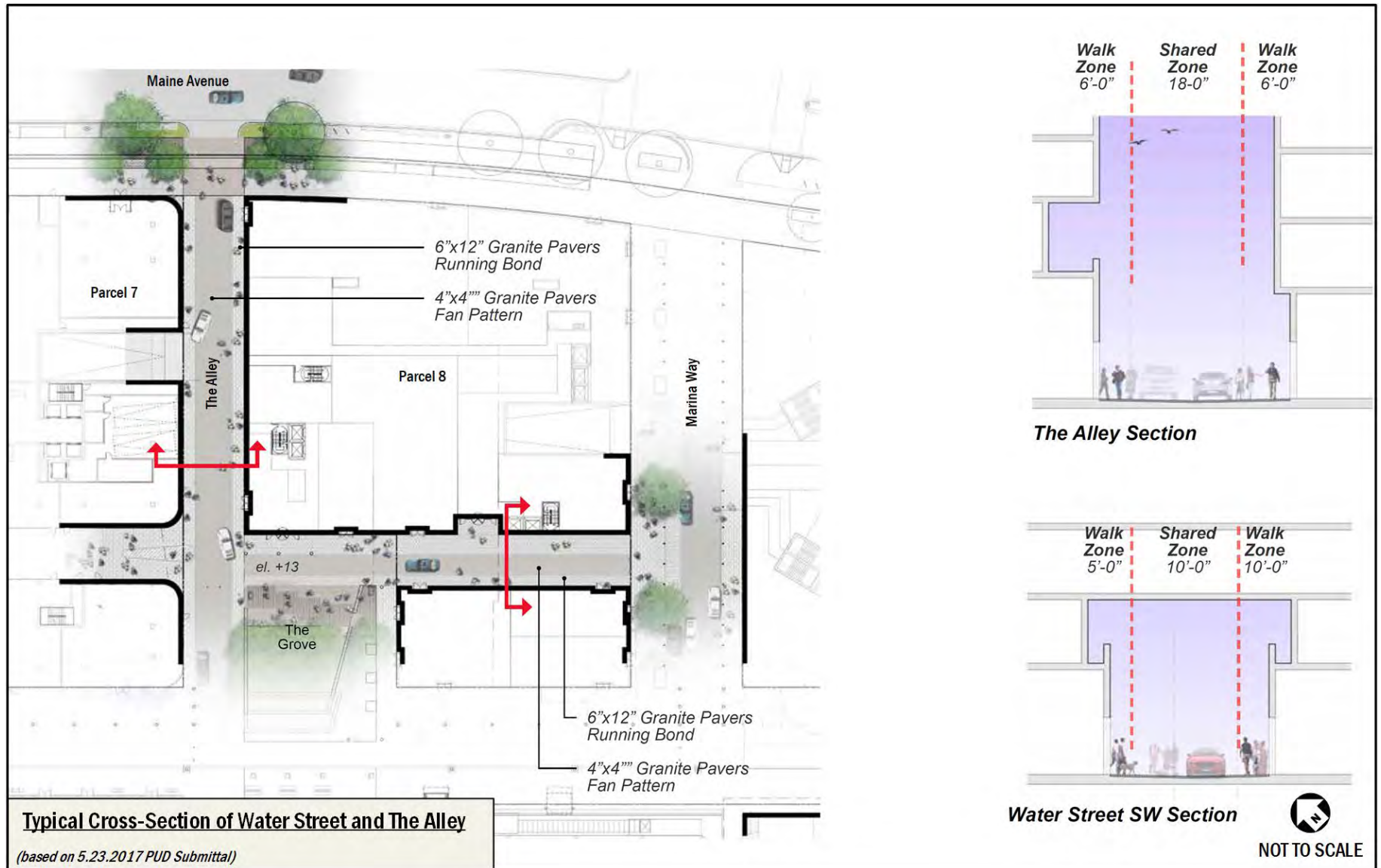


Figure 22: Typical Cross-Section of Water Street and The Alley



SITE ACCESS AND CIRCULATION

Pedestrian Access

Consistent with the First-Stage PUD and subsequent approvals, pedestrian access to the network of internal private roadways that will be constructed as part of Phase 2 of the Wharf will be from Maine Avenue. Once on-site, pedestrian access to the various buildings of Phase 2 (detailed in the previous section for each individual parcel) will be frequent and plentiful thanks to the highly activated ground-floor plan.

Within the site, the Phase 2 of the development will result in new or improved sidewalks along the interior and perimeter of the site. This will be particularly impactful along Maine Avenue, where sidewalks do not meet DDOT standards and along the internal roadways of the site, where few pedestrian facilities currently exist. New pedestrian facilities are expected to meet or exceed DDOT requirements with an emphasis on pedestrian safety and comfort. 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 curb extensions and room for outdoor seating. In addition, the construction of parks, gathering places, consisting of both active and passive open spaces, piers, docks, plazas, and square will further improve pedestrian connectivity. Pedestrian are seen as the primary users of The Wharf's internal roadways, such that automobiles will travel at lower speeds and yield to pedestrians. The combination of low speeds and aesthetically-pleasing design elements creates a pedestrian environment that is safe, functional, and visually appealing. Planned pedestrian facilities and expected circulation for Phase 2 of the Wharf is shown on Figure 23.

Bicycle Access

Bicycle access to Phase 2 of the Wharf will primarily take place via the 10-foot wide, bi-directional, grade-separated cycle track that will be constructed as part of Phase 2 of the Wharf. As part of the First-Stage PUD application, a cycle track stretching from the Fish Market to Water Street was approved. The first section from the Fish Market to 7th Street, which is under construction, will coincide with the opening of Phase 1 of the Wharf. The second section from 7th Street to Water Street will coincide with Phase 2.

In addition, the Applicant has proposed adding Shared Lane ("Sharrows") markings on Water Street, 6th Street, and M Place, which will connect the Maine Avenue cycle track to the Anacostia Riverwalk Trail via Waterfront Park

Once on-site, the internal roadways will provide connections to the secure long-term bicycle parking within the below-grade parking garages of Phase 2 or the short-term bicycle parking spaces that will dot the perimeter and street-level internal to the site. Proposed bicycle facilities and expected circulation are shown on Figure 24.

Vehicular Access

Seven access points, where internal roadways meet Maine Avenue, will provide vehicular access to Phase 2 of the Wharf. These are as follows:

1. Maine Avenue and 7th Street is an existing intersection that will provide full signalized access to 7th Street Park, which connects Phase 1 and Phase 2 of the Wharf. This access point will be used by Phase 1 of the Wharf and for Parcel 6 loading. This access point is under construction and will open with Phase 1 of the Wharf.
2. Maine Avenue and The Oculus will have right-in and right-out access. This access point will be used for limited access for the Parcel 6 loading berth and for drop-off and pick-up associated with the Parcel 6 and Parcel 7 office components, and will also connect to the Wharf's internal streets
3. Maine Avenue and The Alley will have right-in and right-out access. This access point will primarily be used by vehicles entering or exiting the Parcel 7 garage entrance, as well as loading for Parcels 7 and 8.
4. Maine Avenue and Marina Way will provide full signalized access from Maine Avenue. This access point will primarily be used for vehicles to access the Parcel 8 garage entrance, the valet and drop-off/pick-up areas in front of the hotel and residential lobby of Parcel 8, the valet area in front of the Parcel 8 retail pavilion, and loading for Parcel 9. In addition, it is assumed that the majority of vehicles coming to Phase 2 of the Wharf from southeast will use this access point.

This is an improvement over the First-Stage access plan, which included a signalized intersection at Water Street. Based on anticipated peak hour volumes after full buildout, this intersection triggers the need for a signal. A signal warrant for this intersection is included in the Technical Appendix.



5. Maine Avenue and Wharf Street will have right-in access. This access point will primarily be used by vehicles using the condo-only car lift in Parcel 9.
6. Maine Avenue and Water Street will have right in and right-out access. This access point will primarily be used by vehicles entering or exiting the Parcel 10 garage entrance, as well as loading for Parcel 10. This access point currently exists, and services Parcel 11.
7. Maine Avenue and 6th Street is an existing intersection with full signalized access. This intersection provides access to Parcel 11, and will provide access to the Parcel 10 garage access and Parcel 10 loading facilities.

Of note, the location and functionality of these access points follows the First-Stage PUD closely with a few improvements. The locations of the intersections where new internal streets meet Maine Avenue are slightly different, and the location of the traffic signal for Phase 2 has been shifted from Wharf Street to the new roadway between Parcels 8 and 9 (Marina Way). Although there are slight changes, the overall access plan fits within the First Stage access plan. The new location of the traffic signal is an improvement over the First-Stage plan because it is spaced more equally between adjacent intersections.

A circulation plan with vehicular access and circulation is shown on Figure 25.

LOADING

The proposed loading facilities in the development should accommodate all delivery demand without detrimental impacts. Figure 26 shows the locations of the loading berths and service/delivery spaces, and Table 3 outlines the required and planned loading for Phase 2 of the Wharf.

As described above, all loading activities will take place within internal streets. No back-up maneuvers from Maine Avenue or other public streets will be necessary for trucks to access their loading docks. Each building will have their own individual service area, shared between all uses within a building when possible.

As mentioned in the previous section, loading activities are also expected to take place in the shared space on internal roadways that are designed to be flexible in nature and may at times facilitate vehicular access and loading, and at other times

be primarily pedestrian in nature and be filled with café tables, spill over-retail, or special events.

Truck routing to and from the site will be focused on designated primary truck routes, such as Maine Avenue, M Street, 9th Street, and 12th Street. Turning maneuvers into and out of each loading area are included in the Technical Appendix.

The amount of loading expected at the site is estimated as follows:

- As a baseline, it is assumed 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 one (1) truck per move.
- Office building loading assumptions are based on discussions with office building managers and are assumed to be 18 truck deliveries per week per building.
- Hotel loading activity is estimated at three (3) deliveries per day
- Although the exact nature of individual retail spaces is unknown at this time, it is expected that general retail stores will generate an additional two (2) deliveries per day in addition to the baseline shared deliveries.

Using these estimates, the anticipated loading activity for each loading area is shown in Table 4.

The Applicant request relief from the number of loading berths, loading platforms, and service deliver spaces needed to provide to buildings included in Phase 2. Based on the Phase 2 development program, the 1958 Zoning Regulations require one (1) 55-foot loading berth, 11 30-foot loading berths, six (6) service and delivery spaces, 11 loading platforms at 100 square feet, and one (1) loading platform at 200 square feet.

Phase 2 of the Wharf is not planned to contain a 55-foot loading berth. While under the 1958 Zoning Regulations certain land uses are required to provide one or more 55-foot loading berths, under current 2016 Zoning Regulations there is no longer a requirement to provide a 55-foot loading berth. Rather, the existing Zoning Regulations simply require all loading berths to have a minimum depth of 30 feet. This is primarily a result of buildings no longer requiring loading berths that are 55-feet deep as deliveries by large trucks have



begun increasingly rare for many land uses in the District, especially residential. Property owners are more commonly relying on smaller trucks and delivery vans which are easier to maneuver within city’s streets and alleys. In addition, designing for large vehicle loading requires wider roads and curb cuts, and larger turning radii at intersections and entrances to alleys, all of which has negative impacts on the pedestrian environment, bicycle travel, and traffic congestion.

Loading Management Plan (LMP)

Consistent with the First-Stage PUD and subsequent approvals, the Applicant has proposed the following measures to offset any potential impacts that the loading activities of Phase 2 of the Wharf might have on the surrounding intersections and neighborhood:

- A loading dock manager will be designated by the building management for each building. The dock manager will coordinate with vendors and tenants to schedule deliveries and will be on duty during delivery hours.
- All tenants will be required to schedule deliveries that utilize the loading docks – defined here as any loading operation conducted using a truck 20’ in length or larger.
- Truck traffic will be prohibited from standing or parking on Maine Avenue with the exception of designated loading/unloading zones. Vehicles that are not accommodated in the on-site loading dock will need to park in will need to park in an accepted large vehicle lot like the ones listed in the DDOT document Important Information for Charter Bus and Motorcoach Operators.
- A representative of the Operations Manager will supervise all deliveries to the loading area. This loading manager will monitor vehicle, bicycle, and pedestrian traffic on the internal streets during loading ingress and egress and direct truck movements to minimize conflicts.
- Delivery trucks will not be permitted to maneuver during peak periods when traffic volumes are highest or at times that would conflict with trash collection. Peak periods are defined as weekdays (excluding holidays) from 7-9 AM and 4-6 PM.
- Trucks using the loading dock will not be allowed to idle and must follow all District guidelines for heavy vehicle operation including but not limited to DCMR 20 – Chapter 9, Section 900 (Engine Idling), the regulations set forth in DDOT’s Freight Management and Commercial Vehicle Operations document, and the primary access routes listed in the DDOT Truck and Bus Route System.

PARKING

The parking provided by the development should accommodate all parking needs on site.

Zoning Requirements

Pursuant to the First-Stage PUD order, the Wharf project "shall include one or more below-grade parking structure(s) on two or three levels providing parking spaces for approximately 2,100 - 2,650 vehicles. Consistent with these approvals, Phase 1 and Phase 2 of the Wharf will provide a combined total of 2,329 parking spaces. Phase 1 of the Wharf is constructing a single below-grade parking garage (Garage 1) below Parcels 1 to 5 that contains approximately 1,483 vehicular parking spaces.

Phase 2 of the Wharf will include two below-grade parking garages (Garage 2 and Garage 3) which will collectively contain approximately 843 vehicular parking spaces. Garage 2 will be located below Parcels 6 to 8, and will be accessible from the above described ramps along the east side of Parcel 7 and east side of Parcel 8. Garage 2 will be used by the occupants, residents, and visitors of the uses within the Parcel 6 to 8, as well as contain general use parking.

Garage 3 will be located below Parcels 9 and 10, as well as M Street Landing, and will be accessible from the ramp located in the podium level of the Parcel 10 Building along Water Street. Residents of Parcel 9 will also be able to access Garage 3 using two attended vehicle lifts within the Parcel 9 Building. Parking spaces within Garage 3 will be used by occupants, residents, and visitors of the uses within Parcels 9 and 10, as well as include general use public parking. Finally, parking for Wharf Marina, and Water Buildings 1 to 3 will be available in Garage 2 and Garage 3.

The following outlines the zoning parking requirements for Phase 2 of the Wharf:

- Residential
1 space per 3 dwelling units
- Office
1 space per 1,800 square feet, in excess of 2,000 square feet
- Retail
1 spaces per 750 square feet, in excess of 3,000 square feet



- Hotel
1 space per 4 rooms or suites

- Marina
1 space per 4 boat slips

Table 5 outlines the required parking for the development. Phase 2 of the Wharf will supply 843 parking spaces (499 parking spaces in Garage 2 and 344 parking spaces in Garage 3), exceeding the 640 parking spaces required by Zoning by 206 parking spaces.

Practical Parking Demand

Although the Wharf meets the required amount of parking by Zoning, in order to determine if the amount of parking provided is sufficient to not generate a detrimental impact, this report takes a closer look at practical parking needs of the proposed PUD.

The parking demand for Phase 2 was calculated by using two steps:

- Determining the peak parking demand for each use using national parking demand standards, adjusted for use in urban areas and local data and observations on parking demand; and
- Applying shared parking methodologies to account for how different uses have peak demands at different times.

First, peak parking demand was calculated using several methods. For commercial land uses (office, retail, restaurant, and hotel) this report used parking ratios contained in ITE's *Parking Generation*, 4th Edition. These ratios were then adjusted to account for use of alternative modes and synergy between uses. Many people going to and from The Wharf will not choose to drive, as is commonplace throughout the District. In addition, parking ratios can overestimate parking when synergy between uses exists. For example, when an office worker that drove to work goes to lunch in a restaurant on site, they only use one parking space instead of two. Based on Gorove/Slade's experience working in the District, in highly urban areas within the District, commercial land use demand is usually 25% of suburban rates.

For residential uses in the PUD, this report assumes a peak parking demand of 0.45 spaces per unit. This is based on using the Park Right DC web tool (parkrightdc.org), which anticipates a peak demand of 0.55 space per unit for parcels within the

Phase 2 PUD. This report assumes that with the addition of Phase 1 and Phase 2 of The Wharf that the parking demand for the area would decrease slightly compared to existing conditions (which the Park Right DC web tool is based on). Part of the residential uses within the PUD are condominiums, which have a higher parking demand rate than rental units. Thus, this report assumes a parking ratio of 0.75- spaces for the condominiums.

For the marina uses, parking demand for the live-aboards was performed the same as for the residential rental units. Parking demand for the remainder of the marina slips was based on data from ITE's *Parking Generation*, 4th Edition, assuming a 50% reduction due to the urban environment. Then, the methodologies contained within Urban Land Institute's (ULI) *Shared Parking* manual, 2nd edition were employed to determine fluctuations in parking demand through weekdays and weekends for each use. As described above, a floor of the garage is intended to serve general public demand, mostly the various retail uses and office workers. Shared Parking provides usage rates per hour of the day that can be used to determine when the overall peak parking demand occurs. For example, the peak parking demand for office workers does not occur at the same time as the peak parking demand for restaurants, so the Shared Parking methodology allows this to be taken into account. The shared parking analysis did not assume that any residential or dedicated parking (i.e. for the live-aboards and Pier 4) were available to be shared.

The results of the shared parking analysis are contained in Table 6, with charts of weekday parking demand displayed in Figure 27, and weekend demand in Figure 28.

As shown in Figure 27, the peak demand of each land uses totals 939 spaces, which is more than proposed in the supply. But when considering the fluctuations within demand by time of day and day of week, the peak overall parking of Phase 2 is 830 spaces at 2pm on a weekday. The peak on a weekend is 502 spaces on a Saturday.

Thus, the amount of parking proposed is sufficient to accommodate parking demand. It provides a good balance of not encouraging driving as a mode during commuting peak hours, while providing a cushion of supply on weeknights and weekends when office parking demand is low, to accommodate any special events (e.g. patrons of Arena Stage).



This report notes that this supply/demand comparison is an exercise to test whether the proposed supply is appropriate, and that it's not representative of the final parking ratios for the site. The project is planning to be able to change the amount of parking dedicated for each use and contained within the shared reservoir based on actual demand and responding to changes over the life of the project. Parking demand ratios are expected to be similar to those described above, but are also expected to fluctuate and some may end up higher/lower than what was analyzed.

BICYCLE AND PEDESTRIAN FACILITIES

Bicycle Facilities

Consistent with the First-Stage PUD and subsequent approvals, the Wharf will make significant bicycle related improvements over existing conditions in and around the site.

On-Street Bicycle Facilities

The Maine Avenue cycle track will extend from the Fish Market to Water Street, with the section from the Fish Market to 7th Street coinciding with Phase 1 and the section from 7th Street to Water Street planned as part of Phase 2. The cycle track will be 10-foot wide, bi-directional, and grade-separated.

In addition, the Applicant has proposed adding Shared Lane ("Sharrows") markings on Water Street, 6th Street, and M Place, which will connect the Maine Avenue cycle track to the Anacostia Riverwalk Trail via Waterfront Park. The conceptual signing and marking plan for the Maine Avenue cycle track to Anacostia Riverwalk Trail connection is included in the Technical Appendix.

Capital Bikeshare

In addition to the two (2) Capital Bikeshare stations that the Applicant agreed to install or relocate as part of prior approvals, the Applicant will fund the relocation of the Capital Bikeshare station that is currently on the Phase 2 site, as well as fund the installation of one (1) additional Capital Bikeshare stations along the perimeter of the site. An additional Capital Bikeshare station not required in previous approvals is planned to service the Fish Market area. The Applicant is working with DDOT to identify the exact location of the four (4) new and one (1) relocated Capital Bikeshare stations.

As the plan currently stands, the Capital Bikeshare stations are planned at the following locations:

4. Maine Avenue and Market Square
5. Maine Avenue and 9th Street
6. Maine Avenue and 7th Street
7. Maine Avenue and M Street Landing
8. Water Street and M Place

Bicycle Parking

There are two types of bicycle parking: Short-term and long-term. Short-term bicycle parking is provided with racks typically placed outside, near the entrance of a building or destination; long-term parking is usually placed indoor in a secure bike room with restricted access. Short-term parking maximizes convenience, and is perfect for a quick trip. Long-term parking is geared toward commuters and residents, and other trips that are of an extended duration.

Consistent with the First-Stage PUD and subsequent approvals, Phase 2 of The Wharf will include 129 short-term bicycle spaces, 65 at street level along the perimeter of the site and within the site, and 64 within the first level of the below-grade parking garages, Garage 2 and Garage 3. These short-term spaces will include inverted U-racks and other bike racks placed in high-visibility areas. The Applicant is coordinating with DDOT to select locations for these racks in public space.

The project will also include secure long-term bicycle parking. The plans identify a total of 610 long-term spaces located in the first and second levels of the below-grade parking garages, Garage 2 and Garage 3. The first garage level will house 402 long-term bicycle spaces in seven (7) different storage spaces, and the second garage level house 208 long-term bicycle spaces in two (2) separate storage spaces. These long-term storage spaces are provided for residents and employees of office/retail so that they may store their bicycles securely.

Table 2 shows the required bicycle parking per zoning. The 610 secure long-term bicycle parking spaces and 129 short-term bicycle parking spaces will exceed the amount of bicycle parking that is required by Zoning Regulations.



Table 2: Zoning Requirement for Bicycle Parking

Use Requirement	Zoning Requirements*	
	Long-Term	Short-Term
Residential	85 spaces	14 spaces
Retail	11 spaces	8 spaces
Office	16 spaces	none**
Hotel	8 spaces	2 spaces
Marina	none**	none**
Total	120 spaces	24 spaces

**based on 1958 Zoning Regulations, except for Parcel 8 which is based on the 2016 Zoning Regulations*

***not required per 1958 zoning*

Pedestrian Facilities

Consistent with the First-Stage PUD and subsequent approvals, the Phase 2 of the development will result in new or improved sidewalks along the interior and perimeter of the site. This will be particularly impactful along Maine Avenue, where sidewalks do not meet DDOT standards and along the internal roadways of the site, where few pedestrian facilities currently exist. New pedestrian facilities are expected to meet or exceed DDOT requirements with an emphasis on pedestrian safety and comfort. 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 curb extensions and room for outdoor seating. In addition, the construction of parks, gathering places, consisting of both active and passive open spaces, piers, docks, plazas, and square will further improve pedestrian connectivity. Pedestrian are seen as the primary users of The Wharf’s internal streets, such that automobiles will travel at lower speeds and yield to pedestrians. The combination of low speeds and aesthetically-pleasing design elements creates a pedestrian environment that is safe, functional, and visually appealing.

CURBSIDE MANAGEMENT

The Applicant has proposed a number of improvements to the curbside management along both sides of Maine Avenue fronting the Phase 2 perimeter of the site to be coordinated with DDOT. A review of the existing curbside management was conducted, and is shown on Figure 29.

Under existing conditions, there are approximately 31 metered parking spaces and three (3) motorcoach unloading/loading spaces on the southern blockface of Maine Avenue between 6th Street and 7th Street. There are 28 metered parking spaces and three (3) motorcoach unloading/loading spaces on the

northern blockface of Maine Avenue between 6th Street and 7th Street.

The following section describes the proposed improvements to curbside management that are being proposed as part of the development. These were developed in coordination with ANC 6D, DDOT, Entertainment Cruises (EC), SW Business Improvement District, and the Office of the Deputy Mayor for Planning and Economic Development (DMPED), the Applicant has proposed a number of improvements to motorcoach operations along Maine Avenue that service EC at Pier 4, Arena Stage, and other area attractions. The intent of this is to facilitate continued discussions with Entertainment Cruises, DDOT, and The Wharf to develop an actionable operations plan that satisfies all parties and mitigates the impacts of motorcoach operations. Motorcoach Operations

In coordination with ANC 6D, DDOT, Entertainment Cruises (EC), SW Business Improvement District, and the Office of the Deputy Mayor for Planning and Economic Development (DMPED), the Applicant has proposed a number of improvements to motorcoach operations along Maine Avenue that service EC at Pier 4, Arena Stage, and other area attractions. The intent of this is to facilitate continued discussions with Entertainment Cruises, DDOT, and The Wharf to develop an actionable operations plan that satisfies all parties and mitigates the impacts of motorcoach operations.

The Motorcoach Operations Plan was developed using data collected of existing motorcoach use on Maine Avenue and information provided by EC. Data was collected over 48 hours, on May 17th, 2017 and May 18th, 2017 to obtain information on when a bus arrives, the amount of time each bus spends for loading/unloading of passengers and the amount of time each bus is parked (if applicable). In addition, parking sweeps were conducted in 15-minute sweeps over a 12-hour data collection period documenting the number of vehicles, type (motorcoach or passenger vehicle), and license plate numbers to determine how long each vehicle is parked. The data collection plan is shown on Figure 30.

The results of the data collection showed a few trends:

- Unloading/loading areas (Westbound and Eastbound Zones)
There is a steady stream of motorcoaches dropping-off or picking-up EC groups over the course of a regular day.
There is a slight increase in the number of motorcoaches



arriving at the same time during the evenings, but if there are enough unloading/loading spaces, this demand should be met easily.

As shown in Figure 31, the eastbound and westbound unloading/loading zones on Maine Avenue operate very differently. Results of the data collection show that most usage (77%) was in the eastbound designated spaces, and that the designated space on westbound Maine Avenue were mostly used for idling, staging, or parking. The average dwell time of motorcoaches using the eastbound unloading/loading zone was 16 minutes, while the average dwell time of motorcoaches using the westbound unloading/loading zone was 71 minutes. The discrepancy in dwell time is due to the eastbound unloading/loading spaces are used by EC and the westbound unloading/loading spaces are used by a mix of uses. The data implies that EC staff do a good job at minimizing dwell times relative to unstaffed or non-EC buses.

- **Motorcoach parking areas (Zone 1 and Zone 2)**
Data showed that a significant number of cars park in Zone 1 and Zone 2, even though it is designated as motorcoach only parking. In Zone 1, 10 of 26 vehicles recorded parking in Zone 1 were cars. In Zone 2, 23 of 65 vehicles recorded parking in Zone 2 were cars. Given this, additional enforcement will be needed to ensure that areas reserved for motorcoach parking remain free of cars and available to motorcoaches.
- **Metered parking areas (Zone 3 and Zone 4)**
Data showed a faster turnover of parked vehicles than was originally expected, given that parking is allowed for up to 4-hours. The majority of vehicles (52% of vehicles) were parked for less than one hour.

Based on the results of the data collection and information provided by EC, three operational scenarios were developed, covering off-peak season conditions, peak season conditions, and special events during off-peak season:

- **Off-Peak Season Conditions**
Covering the majority of the year (early July to Late March), approximately four (4) to six (6) motorcoach unloading/loading spaces are needed to accommodate anticipated demand. These spaces would be permanent and available for EC's use year-round. Figure 32 shows the curbside management plan for off-peak season conditions

- **Peak Season Conditions**
From approximately late March to early July, approximately 16 motorcoach unloading/loading spaces will be needed to accommodate anticipated demand. The additional spaces for peak season would be made available by converting metered parking to motorcoach unloading/loading zones. Figure 33 shows the curbside management plan for peak-season conditions.
- **Special Events During Off-Peak Season Conditions**
Occasionally during the off-peak season, there will be a day when peak conditions are expected (e.g. field trips during the fall). Additional spaces for these special events would be made available via temporary signs by applying for Public Space Permits.

The proposed Motorcoach Operations Plan describes and outlines the operational workflow regarding the unloading and loading of groups bound for EC for each of these operational scenarios.

The proposed Motorcoach Operations Plan is included in the Technical Appendix.

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.

For PUDs, a TDM plan is usually a set of strategies and operational measures that are committed to in a Zoning Order, after discussions between the Applicant and DDOT. For Phase 1, instead of TDM being a set list of strategies and measures, a monitoring plan was established. Using a monitoring plan is a different style of TDM plan that allows the Applicant to control what TDM measures they include, as long as they demonstrate that the project is meeting certain vehicular trip generation thresholds. It allows the Applicant flexibility in selecting how to reduce their vehicular impact. A monitoring plan was used for Phase 1 at The Wharf because it is a significantly large project, with lots of multi-modal elements built into the project itself.



Thus, it was difficult to determine what a set TDM plan should include.

This report recommends that the monitoring plan developed for Phase 1 be extended across the entirety of The Wharf. This maintains the flexibility provided by the plan. It will also provide data that will be useful for the Applicant to help alter aspects of the TDM plan going forward, and for DDOT to help detail how a large multi-use development operates.

TDM Monitoring Plan

The TDM monitoring plan proposed below is the same as to what was agreed upon during the Zoning process for Phase 1, updated to reflect that it now covers the entire Wharf project.

The plan is split into two parts, (1) the primary monitoring plan reviews site generated trips and is the focus of TDM monitoring, and (2) a secondary monitoring plan that reviews event management and curbside operations.

The primary monitoring plan includes the following:

- The first monitoring cycle will occur once Phase 1 (Parcels 1 through 5, 11 and Pier 4) reaches 70% of commercial occupancy and 90% of residential occupancy.
- Data will be collected only during the months of September through October and March through May when both DC Public Schools and Congress are in session. Data will be collected for three days, a Tuesday, Wednesday and Thursday.
- The data collected will include all vehicular trips generated by the development during the AM and PM commuter peak hours, and will be based on counts of garage in and outs, and pick-up/drop-off activity generated by The Wharf Phase 1. A methodology for collecting the data will be presented to DDOT prior to the counts for their review and comment.
- The total trip generation of The Wharf will be compared to the projections contained within this CTR. The trip generation thresholds used can be altered based on occupancy and completeness of various Parcels within The Wharf. A methodology for setting the trip thresholds will be presented to DDOT prior to the counts for their review and comment. If the counts exceed projections by more than 10%, the applicant will update the TDM and mitigation plan by adding or enhancing TDM elements.

- The counts and proposed changes to the TDM plan, if any, will be documented and sent to DDOT for their review. The applicant will provide DDOT sufficient time to review and comment on any proposed TDM changes prior to their implementation.
- The monitoring cycle will repeat every six months. If three consecutive monitoring cycles do not exceed projected trips by more than 10%, then monitoring will cease.
- If two consecutive monitoring cycles show trips exceeding projected trips by over 10%, then the applicant will perform a TDM survey of employees and residents to help identify what further TDM adjustments are needed.
- A second phase of monitoring will begin once Phase 2 (Parcels 6 through 10) reaches 70% of commercial occupancy and 90% of residential occupancy. This phase of monitoring will follow the same methodology as the monitoring plan for Phase 1.

The secondary monitoring plan includes observing and adjusting operational aspects of the site. Its purpose is not to determine how the site impacts travel on adjacent streets, but rather to ensure that the site is operating well and not negatively impacting public space. It includes the following:

- The first secondary monitoring report will occur once Phase 1 (Parcels 1 through 5, 11 and Pier 4) reaches 70% of commercial occupancy and 90% of residential occupancy.
- A second will be performed once Phase 2 (Parcels 6 through 10) reaches 70% of commercial occupancy and 90% of residential occupancy.
- Data will be collected and observations made only during the months of September through October and March through May when both DC Public Schools and Congress are in session. A methodology for collecting the data will be presented to DDOT prior to the counts for their review and comment.
- The data collected and observations made will include:
 - Evening commuter peak hour trip generation during an event at Wharf Hall
 - Saturday peak trip generation for the project, with and without an event
 - Peak parking occupancy on site, during a weekday and Saturday, both with and without events
 - Peak bicycle parking occupancy on site during a weekday and Saturday, both with and without events



- Pedestrian crossings along the site frontage across Maine Avenue, during a weekday evening peak and Saturday peak, both with and without events
- Observations (including counts and longest length of queues) at all pick-up/drop-off areas, including taxis, charter buses, and valet operations. Times to be based on highest reported activities, such as Friday nights during events and Saturdays during events, and during peak tour boat demand.
- The observations and data collected will be documented and presented to DDOT, along with a list of operational adjustments planned. The applicant will provide DDOT sufficient time to review and comment on any proposed changes prior to their implementation.
- The Applicant will fund the installation of two (2) new Capital Bikeshare stations, one (1) along Maine Avenue and one (1) near Waterfront Park.
- The installation of a grade-separated bi-directional cycle track along Maine Avenue.
- The installation of Shared Lane markings (“Sharrows”) and other improvements along 6th Street, M Place, and Water Street, that will connect the Maine Avenue cycle track to the Anacostia Riverwalk Trail.

Additional monitoring of the items listed above will be based on their performance in the initial monitoring cycle and discussions with DDOT.

Initial Phase 2 TDM

The exact TDM measures incorporated into Phase 2 will be determined by the Applicant. At minimum, they propose starting with the following:

- The Applicant will significantly exceed Zoning requirements to provide bicycle parking/storage facilities at the proposed development. This includes secure parking located on-site and short-term bicycle parking around the perimeter of the site.
- The Applicant will unbundle the cost of residential parking from the cost of lease or purchase of each unit.
- The Applicant will identify TDM Leaders (for planning, construction, and operations). The TDM Leaders will work with residents and employees in the development to distribute and market various transportation alternatives and options.
- The Applicant will provide TDM materials to new residents in the Residential Welcome Package materials.
- The Applicant will provide residents and employees who wish to carpool with detailed carpooling information and will be referred to other carpool matching services sponsored by the Metropolitan Washington Council of Governments (MWCOG).
- The Applicant will install a Transportation Information Center Display (electronic screen) within each of the residential and office lobbies containing information related to local transportation alternatives.

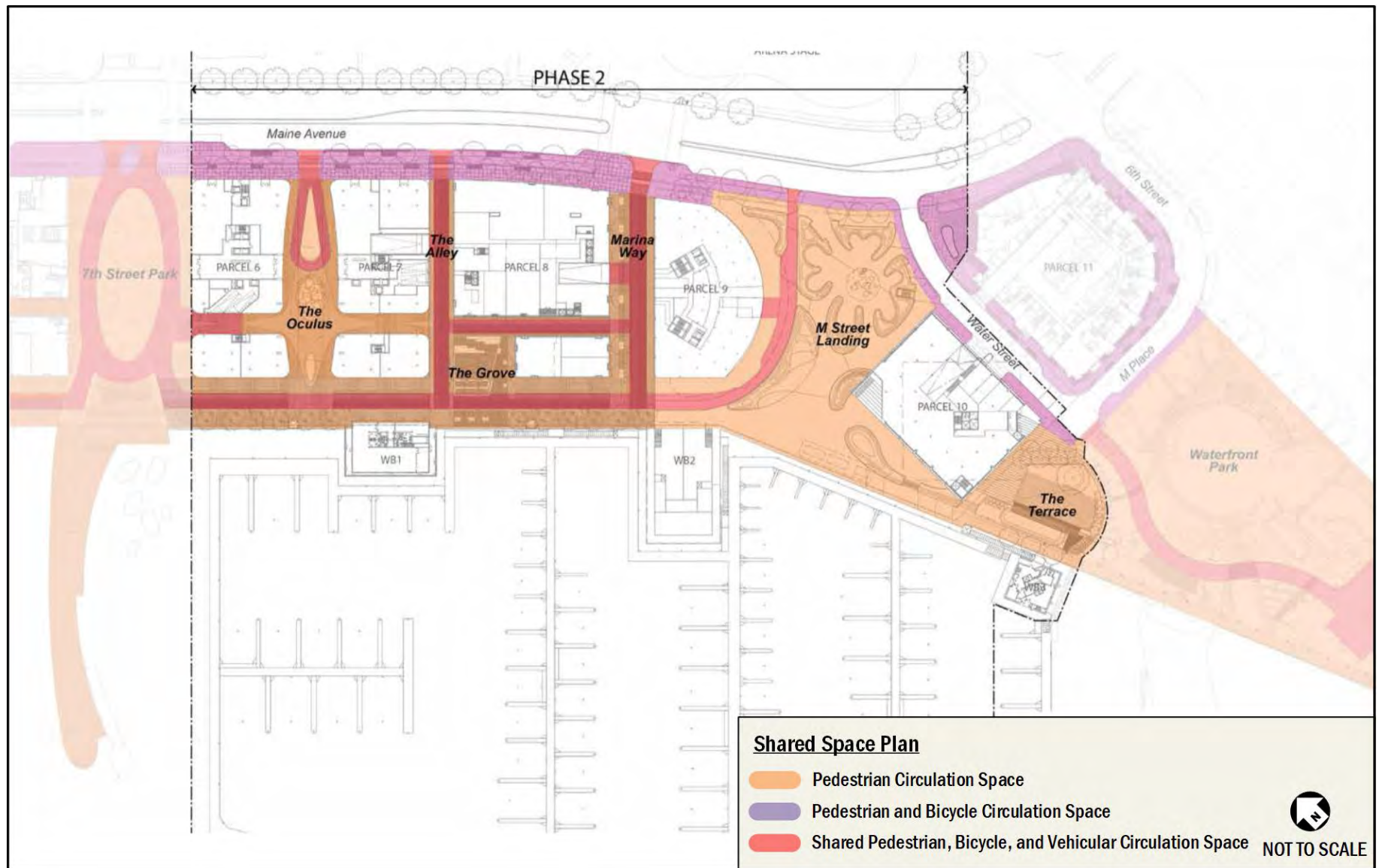


Figure 23: Shared Space Plan

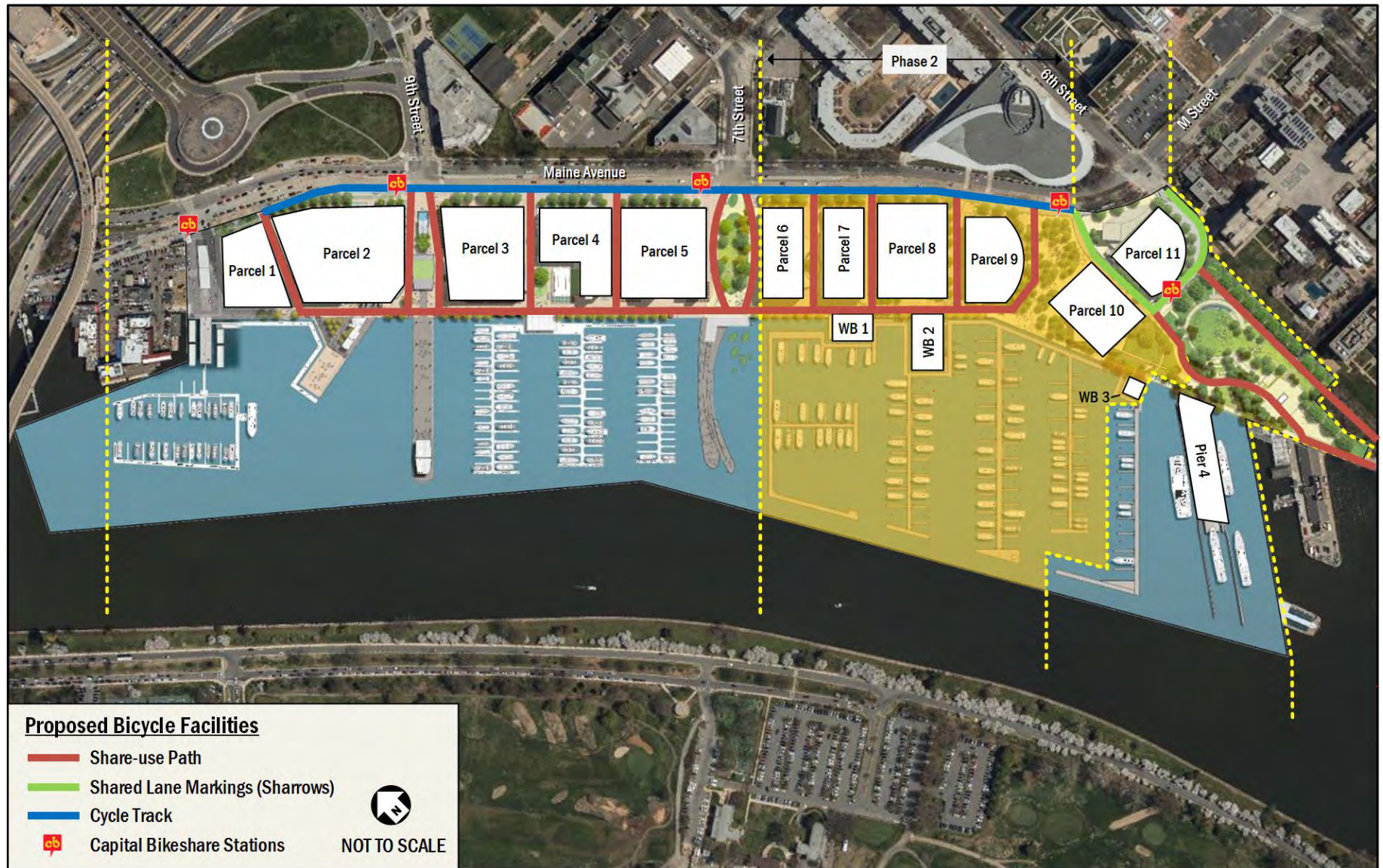


Figure 24: Proposed Bicycle Facilities

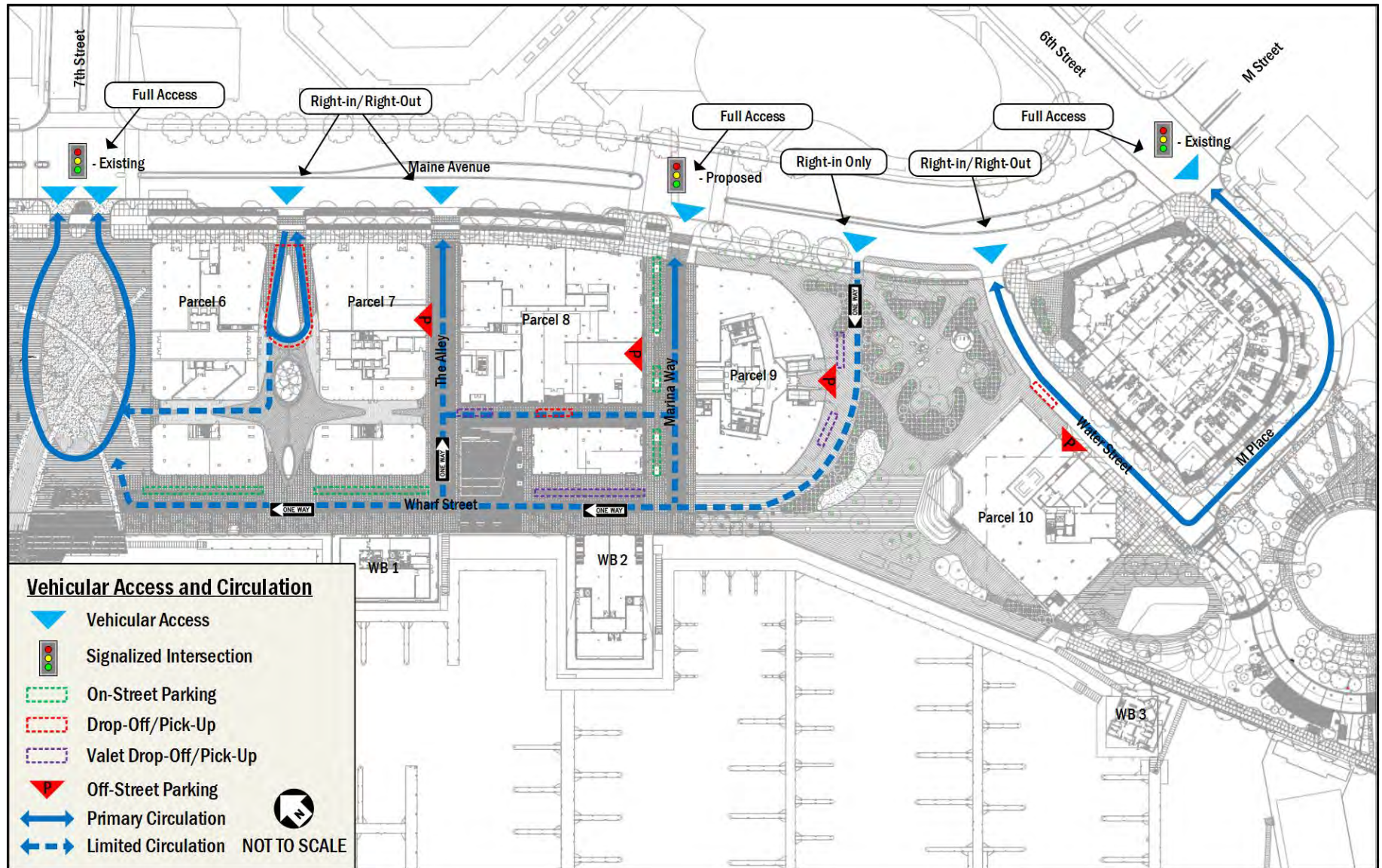


Figure 25: Vehicular Access and Circulation

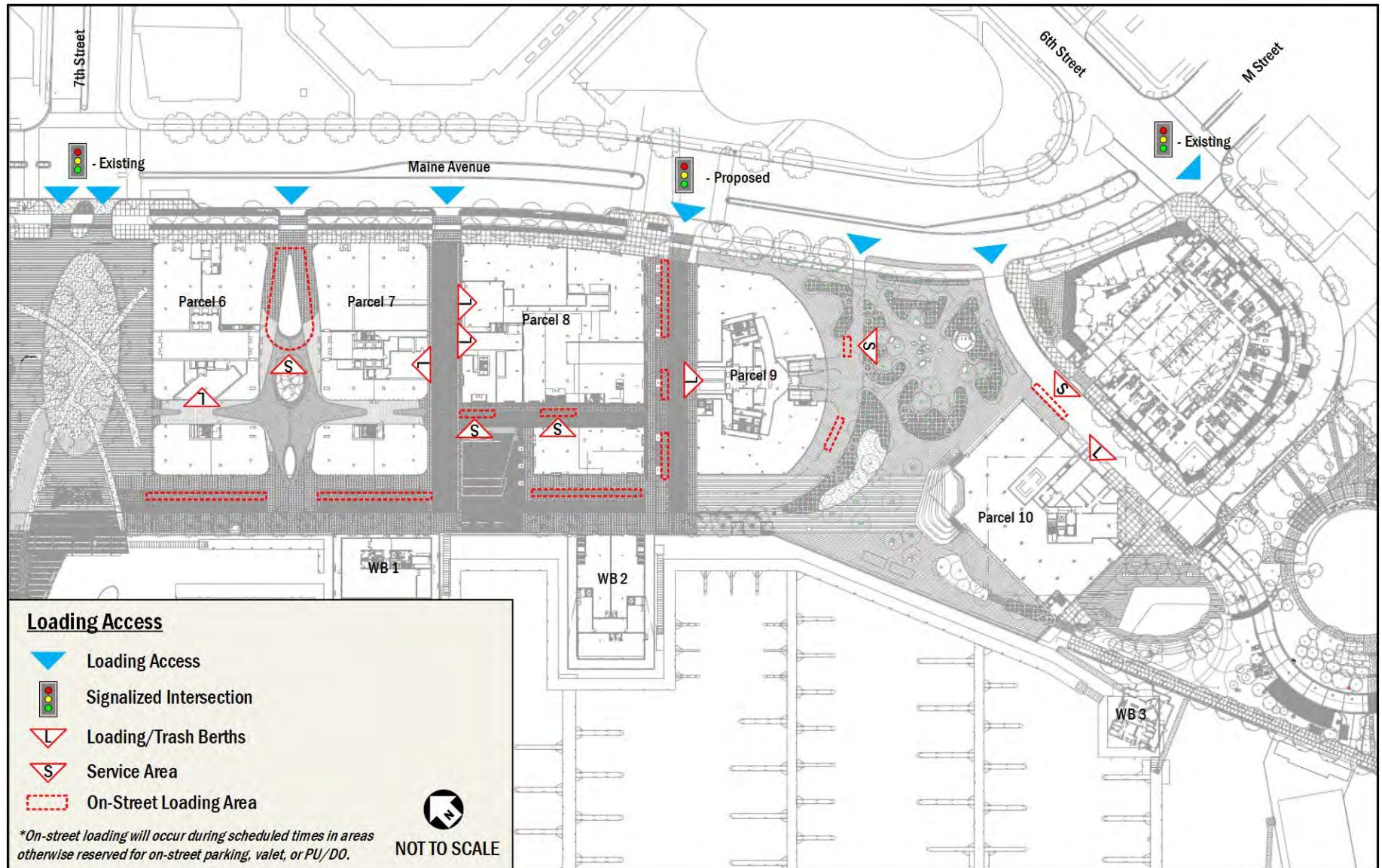


Figure 26: Loading Access



Table 3: Required and Planned Loading Facilities

Parcel/Building	Use Requirement	Berth	Service/Delivery
Parcel 6	Office	3 @ 30'	1 @ 20'
	Retail	none	
	Total Required	3 @ 30'	1 @ 20'
	Total Provided*	1 @ 30'	1 @ 20'
Parcel 7	Office	3 @ 30'	1 @ 20'
	Retail	none	
	Total Required	3 @ 30'	1 @ 20'
	Total Provided*	2 @ 30'	1 @ 20' (curbside)
Parcel 8**	Residential	1 @ 30'	1 @ 20'
	Retail	2 @ 30'	1 @ 20'
	Hotel	2 @ 30'	1 @ 20'
	Total Required	2 @ 30'	1 @ 20'
	Total Provided*	4 @ 30'	3 @ 20' (curbside)
Parcel 9	Residential	1 @ 55'	1 @ 20'
	Retail	none	
	Total Required	1 @ 55' and	1 @ 20'
	Total Provided*	2 @ 30'	1 @ 20' (curbside)
Parcel 10	Office	2 @ 30'	1 @ 20'
	Retail	1 @ 30'	
	Total Required	3 @ 30'	1 @ 20'
	Total Provided*	1 @ 30'	1 @ 20' (curbside)
Water Building 1	Retail	none	
	Recreational Service	none	
	Total Required	none	
	Total Provided	none (curbside loading is available)	
Water Building 2	Retail	none	
	Recreational Service	none	
	Total Required	none	
	Total Provided	none (curbside loading is available)	
Water Building 3	Recreational Service	none	
	Total Required	none	
	Total Provided	none (curbside loading is available)	
Total Phase 2	Required	1 @ 55' and 11 @ 30'	5 @ 20'
	Provided*	10 @ 30'	7 @ 20'

*relief requested

**as Parcel 8 is requesting a modification from the First-Stage PUD, it now falls under the 2016 Zoning Regulations and not the 1958 Zoning Regulations that the First-Stage PUD was approved under.



Table 4: Anticipated Daily Loading Demand

Parcel/Building	Proposed Loading Facilities	Anticipated Daily Loading Demand
Parcel 6	Two (2) 30' Loading Berths	Seven (7) Truck deliveries
	One (1) Curbside Service/Delivery Area	Four (4) Van deliveries
Parcel 7	Two (2) 30' Loading Berths	Eight (8) Truck deliveries
	One (1) Curbside Service/Delivery Area	Four (4) Van deliveries
Parcel 8	Four (4) 30' Loading Berths	12 Truck deliveries
	Three (3) Curbside 20' Service/Delivery Areas	Six (6) Van deliveries
Parcel 9	Two (2) 30' Loading Berths	Five (5) Truck deliveries
	One (1) 20' Curbside Service/Delivery Area	Three (3) Van deliveries
Parcel 10	One (1) 30' Loading Berth	Five (5) Truck deliveries
	One (1) 20' Service/Delivery Area	Four (4) Van deliveries
Water Building 1	None (curbside loading is available) *	One (1) Truck delivery
		One (1) Van Delivery
Water Building 2	None (curbside loading is available) *	One (1) Truck delivery
		One (1) Van Delivery
Water Building 3	None (curbside loading is available) *	One (1) Truck delivery
		One (1) Van Delivery
Total	Ten (10) 30' Loading Berths	45 Truck deliveries
	Seven (7) 20' Curbside Service/Delivery Area*	24 Van deliveries

**it is expected that on-street loading will occur during scheduled times in areas otherwise reserved for on-street parking, valet, or pick-up and drop-off*



Table 5: Off-Street Parking Requirements

Parcel/Building	Land Use	Zoning Requirement
Parcel 6	Office	152 spaces
	Retail	18 spaces
	Total	170 spaces
Parcel 7	Office	117 spaces
	Retail	22 spaces
	Total	139 spaces
Parcel 8	Residential	59 spaces
	Retail	31 spaces
	Hotel	62 spaces
	Total	152 spaces
Parcel 9	Residential	21 spaces
	Retail	17 spaces
	Total	38 spaces
Parcel 10	Office	32 spaces
	Retail	18 spaces
	Total	50 spaces
Water Building 1	Retail	11 spaces
	Recreational Services	none
	Total	11 spaces
Water Building 2	Retail	13 spaces
	Recreational Services	1 space
	Total	14 spaces
Water Building 3	Recreational Services	3 spaces
	Total	3 spaces
Wharf Marina	Marina	63 spaces
	Total	63 spaces
Overall Phase 2		640 spaces

Table 6: Summary of Parking Demand

Land Use	Peak Parking Ratio	Amount	Parking Demand		
			Peak (at any time)	Weekday Peak (2pm)	Weekend Peak (8pm)
Office	0.71/1,000 GSF	577,504 GSF	406	406	0
Retail – General*	0.64/1,000 GLA	71,435 GLA	46	32	32
Retail – Restaurant*	4.08/1,000 GLA	47,624 GLA	194	121	194
Hotel	0.30/Room	116 Rooms	35	29	28
Residential - Rental	0.45/Unit	329 Units	149	149	149
Residential – Condo	0.75/Unit	82 Units	62	62	62
Marina – General			27	21	27
Marina – Pier 4			10	10	10
Total			929	830	502

* - 40% of retail space is assumed occupied by restaurants

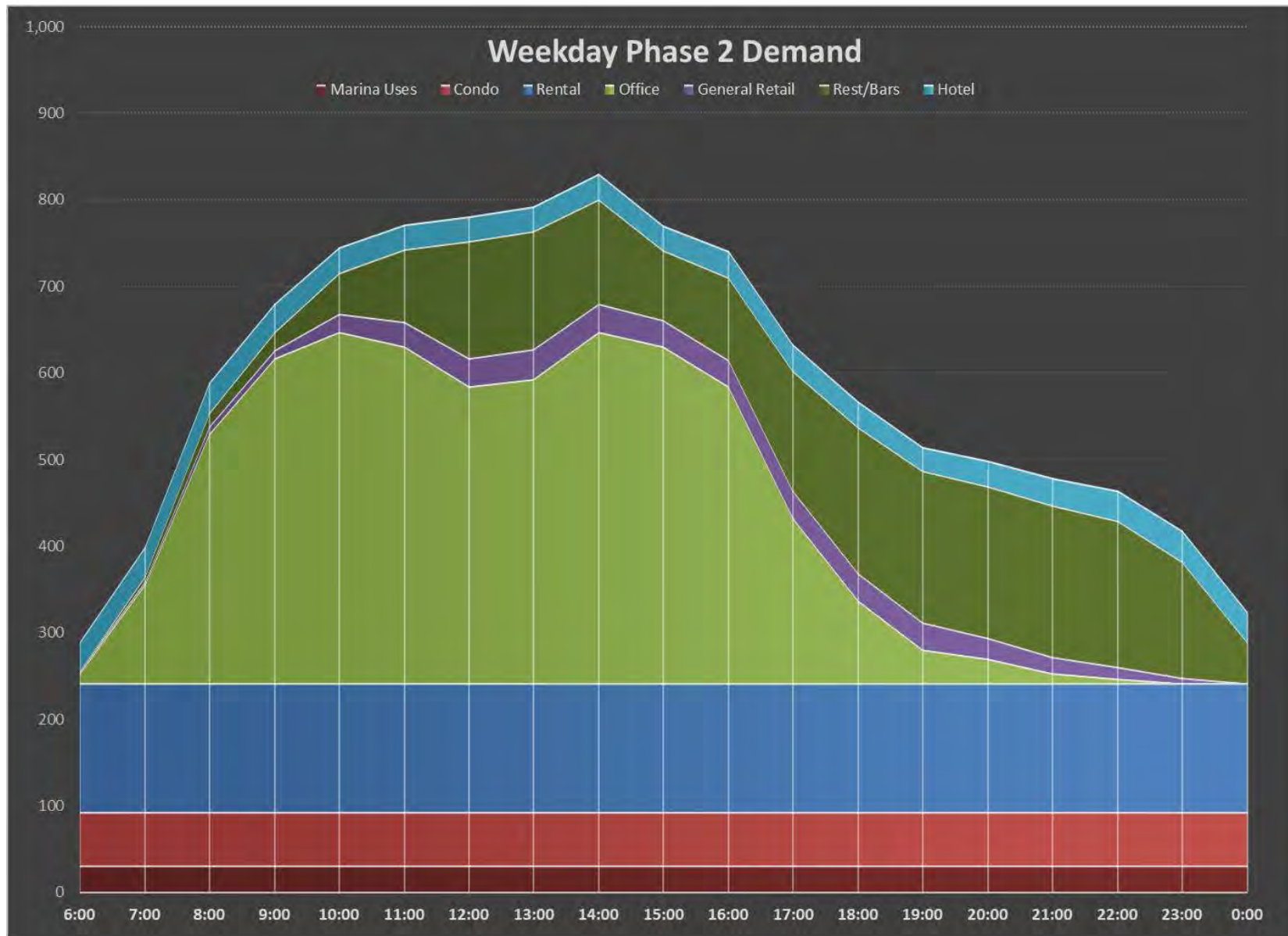


Figure 27: Weekday Phase 2 Parking Demand

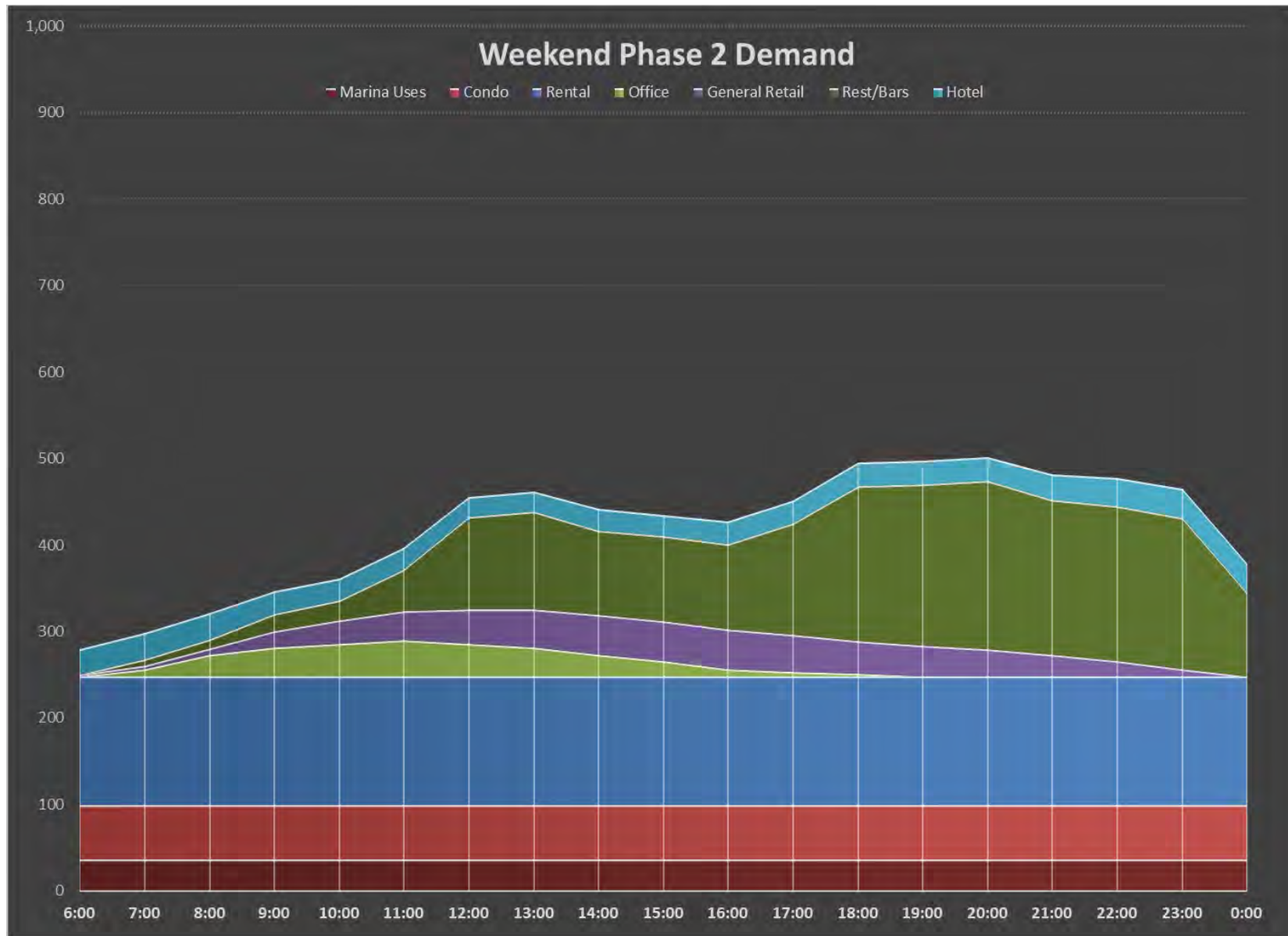


Figure 28: Weekend Phase 2 Parking Demand

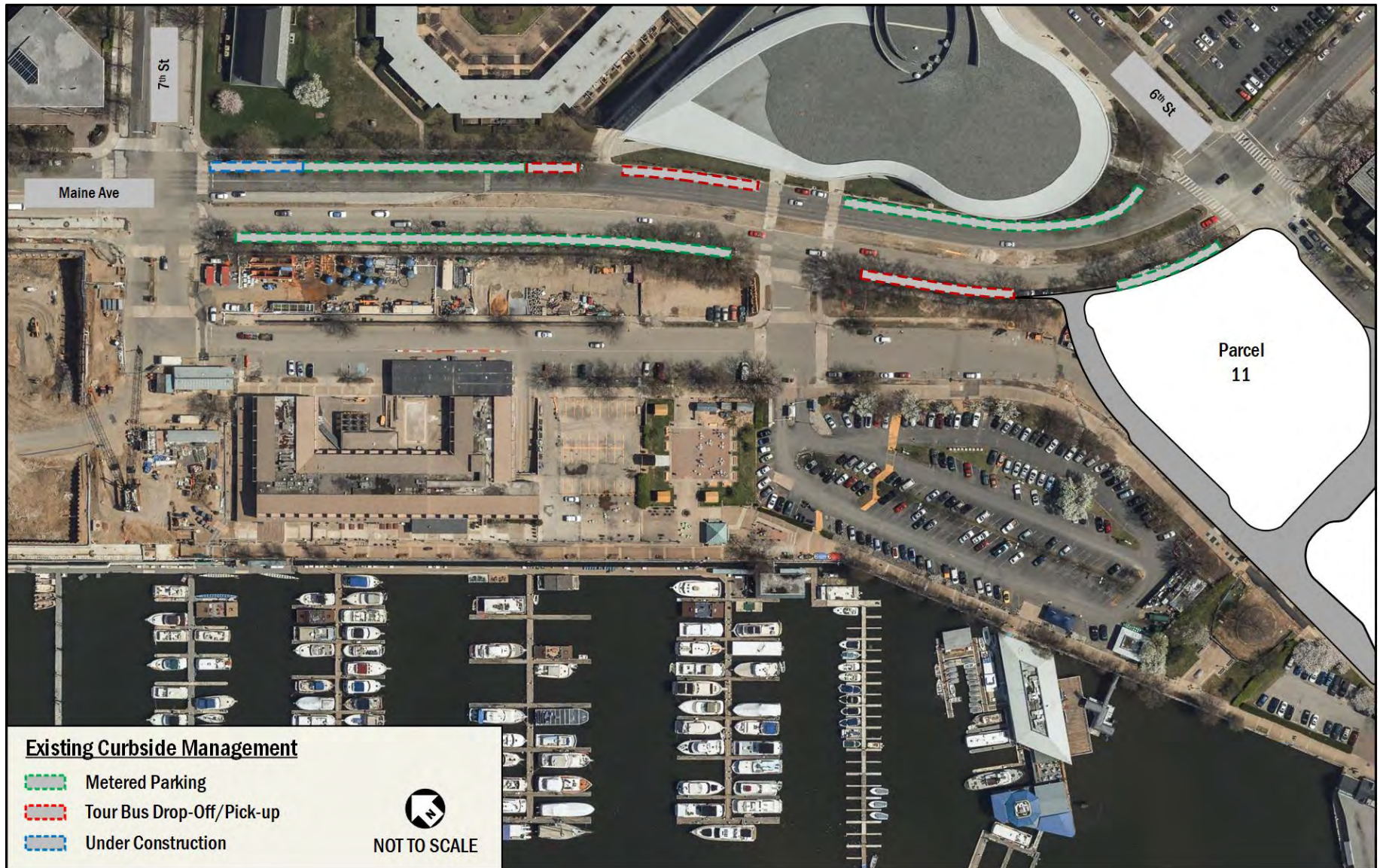


Figure 29: Existing Curbside Management

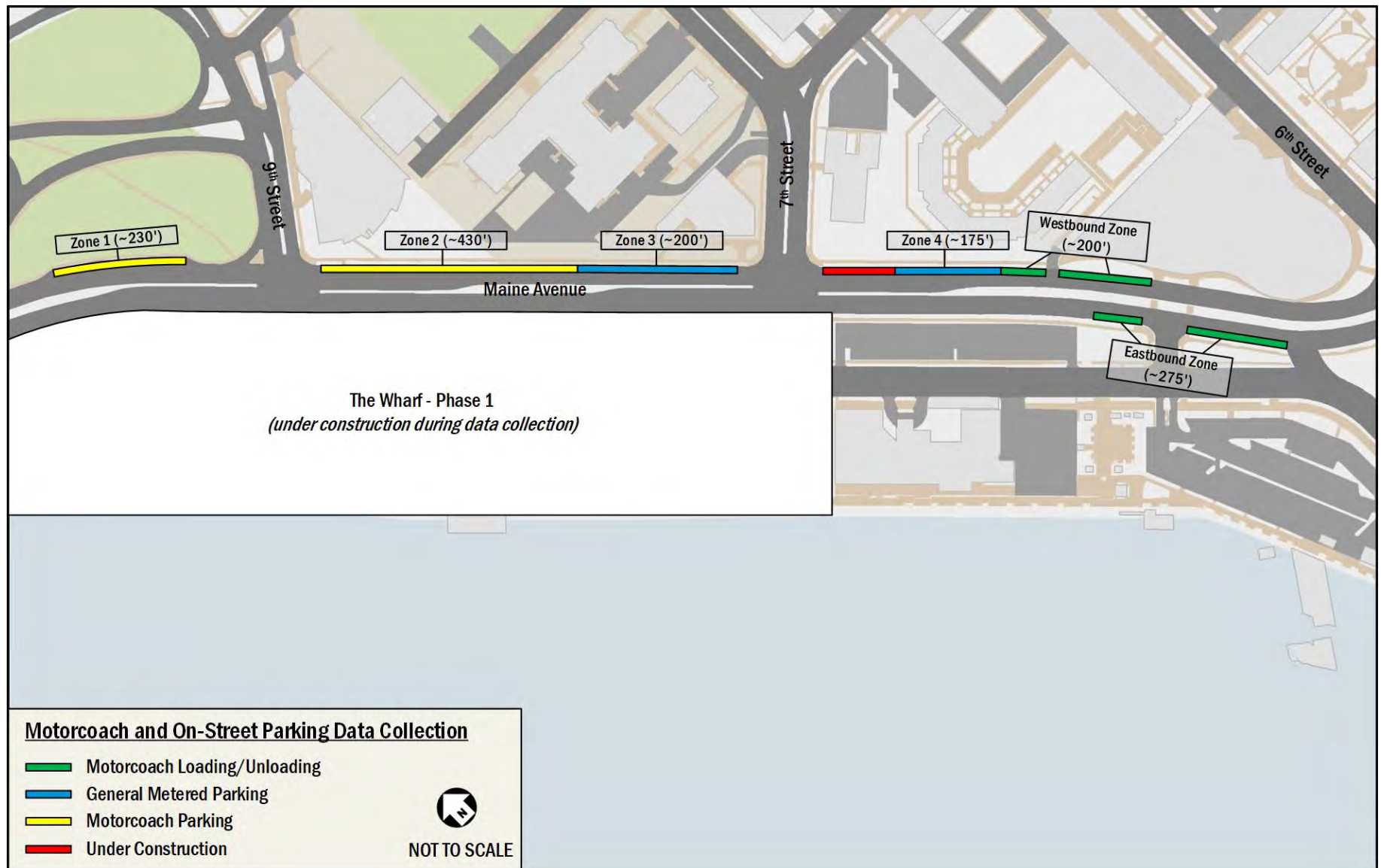


Figure 30: Motorcoach and On-Street Parking Data Collection Plan

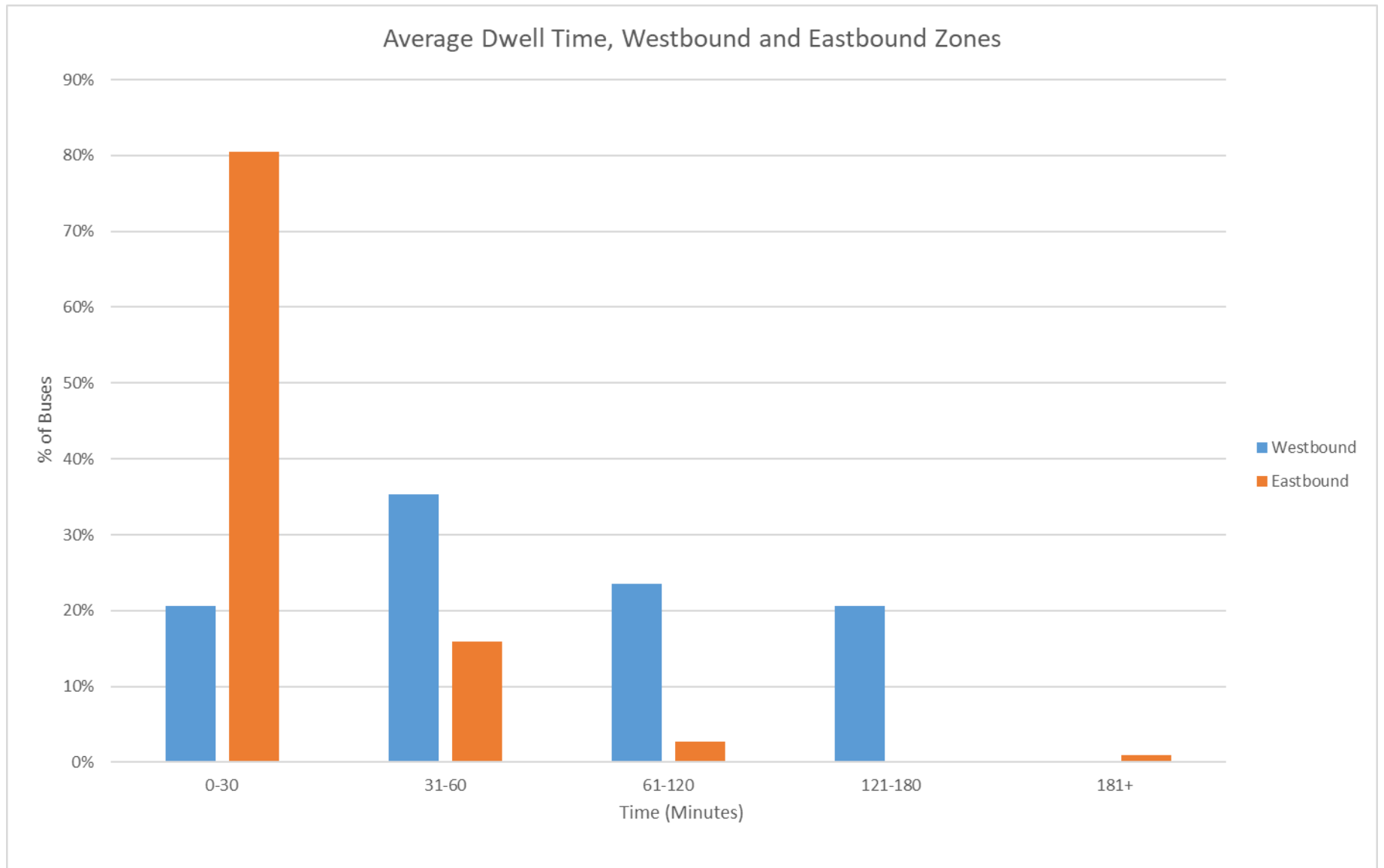


Figure 31: Average Motorcoach Dwell Time

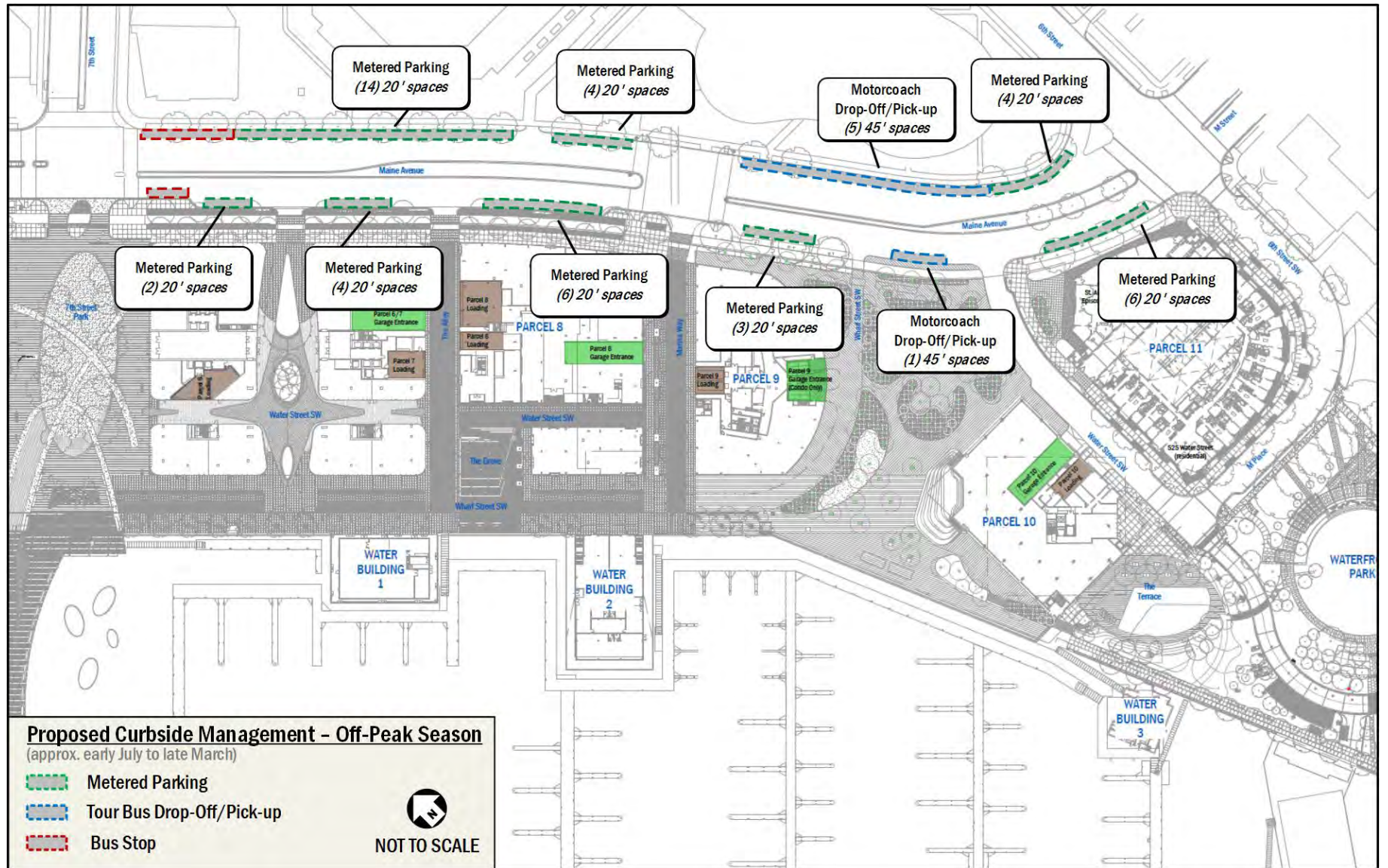


Figure 32: Proposed Curbside Management – Off-Peak Season

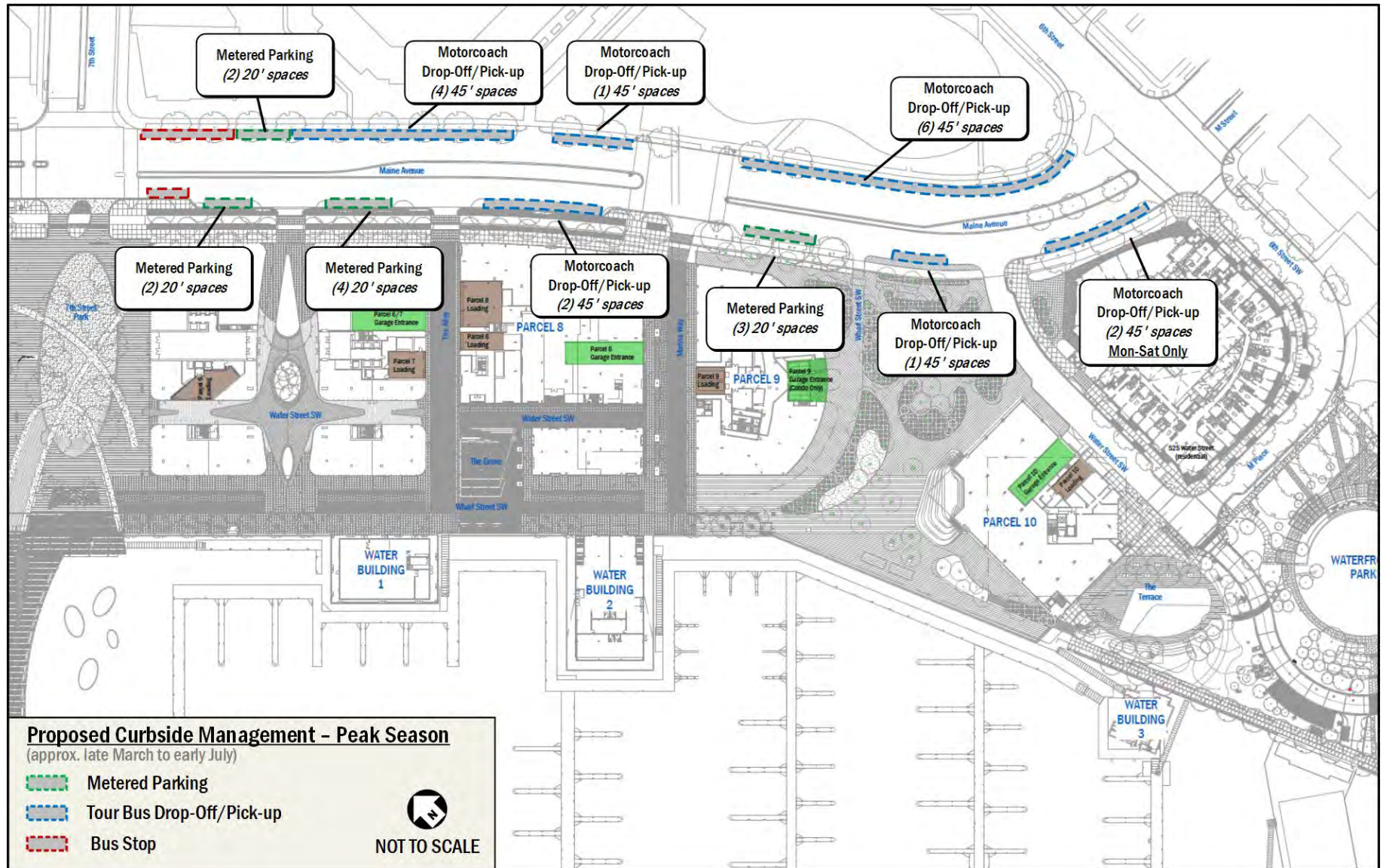


Figure 33 Proposed Curbside Management – Peak Season



TRIP GENERATION

This section outlines the transportation demand of the proposed Wharf Phase 2 project. It summarizes the projected trip generation of the site by mode, which forms the basis for the chapters that follow. These assumptions were vetted and approved by DDOT as a part of the scoping process for the study.

First-Stage vs Second-Stage Development Program

The overall development for Phase 2 has been slightly modified from the development program analyzed as part of the First-Stage PUD. Apart from the addition of the hotel uses to Parcel 8, the change in Phase 2’s development program from the First-Stage PUD is consistent with flexibility that was approved as part of the First-Stage PUD and subsequent approvals.

Methodology

Traditionally, weekday peak hour trip generation is calculated based on the methodology outlined in the Institute of Transportation Engineers’ (ITE) *Trip Generation Manual*, 9th Edition. This methodology was supplemented to account for the urban nature of the site (the *Trip Generation Manual* provides data for non-urban, low transit use sites) and to generate trips for multiple modes, as vetted and approved by DDOT.

Residential trip generation was calculated based on ITE land use 220, Apartment, and on ITE land use 230, Condo/Townhome, splitting trips into different modes using assumptions derived from 2015 census data for the residents that currently live near the site. The vehicular mode split was then adjusted to reflect the parking supply and other developments with similar proximity to Metrorail. The condo component was adjusted upwards based on assumed increased auto usage.

Retail trip generation was calculated based on ITE land use 820, Shopping Center. Mode splits for the retail portion of the site were based on information about similar sites with retail contained in WMATA’s 2005 *Development-Related Ridership Survey* and mode splits used in the Wharf Phase 1 Second-Stage CTR.

Office trip generation was calculated based on ITE land use 710, General Office Building, splitting trips into different modes using assumptions derived from census data for the employees

that currently work near the site. The mode splits were then adjusted to reflect the parking supply, the proximity to Metrorail, and the improved bicycle facilities in the area. The office mode split was primarily based on the mode split used in the Wharf Phase 1 Second-Stage CTR.

Hotel trip generation was calculated based on ITE land use 310, Hotel. Mode splits for the hotel portion of the site were based on information about similar hotels contained in WMATA’s 2005 *Development-Related Ridership Survey*. The proximity of the site to Metrorail was also a determinant factor for assigning hotel mode split.

Trip associated with the Wharf Marina were accounted for in two ways: (1) the 94 boat slips used by live-aboard slip license holders were calculated using the same methodology as the non-ownership residential uses of Phase 2; and (2) the trip generation for the 156 recreational boat slips was calculated based on ITE land use 420, Marina. Mode splits for the Marina portion of the site were based on information provided by the Applicant, which estimated that about 50% of recreational boat slip users drive to the site.

The mode split assumptions for all land uses within the development is summarized in Table 7. A summary of the multimodal trip generation for Phase 2 of the Wharf is provided in Table 8 for both peak hours. Detailed calculations are included in the Technical Appendix.

Table 7: Summary of Mode Split Assumptions

Land Use	Mode			
	Auto	Transit	Bike	Walk
Residential (Apartment)	25%	50%	10%	15%
Residential (Condo)	40%	40%	5%	15%
Retail	19%	56%	15%	10%
Office	42%	47%	8%	3%
Hotel	40%	40%	5%	15%
Marina	50%	25%	10%	15%



Table 8: Phase 2 Multi-Modal Trip Generation Summary

Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Auto	379 veh/hr	108 veh/hr	487 veh/hr	176 veh/hr	396 veh/hr	570 veh/hr
Transit	578 ppl/hr	217 ppl/hr	793 ppl/hr	500 ppl/hr	789 ppl/hr	1291 ppl/hr
Bike	108 ppl/hr	43 ppl/hr	150 ppl/hr	116 ppl/hr	168 ppl/hr	284 ppl/hr
Walk	63 ppl/hr	46 ppl/hr	109 ppl/hr	96 ppl/hr	109 ppl/hr	206 ppl/hr



TRAFFIC OPERATIONS

This section provides a summary of an analysis of the existing and future roadway capacity in the study area. Included is an analysis of potential vehicular impacts of the Wharf development and a discussion of potential improvements.

The purpose of the capacity analysis is to:

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

The capacity analysis focuses on the morning and afternoon commuter peak hours, as determined by the existing traffic volumes in the study area. The scope of the capacity analysis was developed based on DDOT guidelines and agreed to by DDOT staff.

The following conclusions are reached within this chapter:

- The existing study area intersections operate at an acceptable level of service during all analysis scenarios for both the morning and afternoon peak hours.
- Future areas of concern for roadway capacity, without Wharf related traffic, are primarily focused along the heavily trafficked commuter routes such as Maine Avenue.
- As is expected of infill developments of this size, the addition of Wharf related traffic pushes seven intersections past levels of service that require exploring mitigations,
- Mitigation measures were analyzed and discussed for these intersections, of which feasible solutions were recommended for implementation given DDOT approval.
- Overall, this report concludes that the project will not have a detrimental impact to the surrounding vehicular network.

STUDY AREA, SCOPE, & METHODOLOGY

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

The scope of the analysis contained within this report was extensively discussed with and agreed to 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 analyses are performed to determine if the proposed development 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), (2) with Phase 1 of the development (referred to as the Interim condition), and (3) with Phase 1 and Phase 2 of the development (referred to as the Future condition).

As agreed to with DDOT, an “Existing Conditions” capacity analysis was not included as an analysis scenario. Traffic volumes collected for this effort were collected while Phase 1 of the Wharf was under construction on Tuesday, May 23, 2017 and Thursday, June 8, 2017 (referred to as 2017 volumes). DDOT requested that the 2017 volumes be adjusted to reflect conditions where Phase 1 of the Wharf is not under construction. As such, traffic volumes used in the First-Stage PUD collected in 2010 were compared to the 2017 volumes along the Maine Avenue study intersections and adjusted accordingly to reflect conditions prior to construction as accurately as possible. Given that the traffic volumes collected in 2017 for the Phase 2 analysis were modified at the request of DDOT to reflect pre-construction levels of traffic and that the capacity analysis does not rely on existing conditions as a comparison point when determining impacts, it was determined that an existing condition neither exists nor is essential in determining future impacts.

As such, the roadway capacity analysis examined the following scenarios:

1. 2022 Future Conditions without Phase 1 or Phase 2 of the Wharf (2022 Background)



2. 2022 Future Conditions with Phase 1 of the development (2022 Interim)
3. 2022 Future Conditions with Phase 1 and Phase 2 of the development (2022 Future)

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 site access points, the following intersections were chosen and agreed upon by DDOT for analysis:

1. Maine Avenue/14th Street Bridge On-Ramp
2. Maine Avenue/14th Street Bridge Off-Ramp
3. Maine Avenue/12th Street
4. Maine Avenue/Market Square
5. Maine Avenue/Blair Alley
6. Maine Avenue/9th Street
7. Maine Avenue/Sutton Square
8. Maine Avenue/Pearl Street
9. Maine Avenue/7th Street
10. Maine Avenue/The Oculus
11. Maine Avenue/The Alley
12. Maine Avenue/Marina Way
13. Maine Avenue/Wharf Street
14. Maine Avenue/Water Street
15. Maine Avenue/M Street/6th Street
16. M Street/4th Street
17. 9th Street/G Street/I-395 Exit Ramp
18. 9th Street/L'Enfant Promenade
19. 7th Street/Frontage Road
20. 7th Street/I-395 On-Ramp
21. 7th Street/G Street
22. 7th Street/I Street
23. 6th Street/I Street
24. 4th Street/I Street

Figure 34 shows a map of the study area intersections.

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. The results of the traffic counts are included in the Technical Appendix.

As described above, due to the construction of Phase 1 of the Wharf, DDOT requested that volumes be adjusted using 2010 traffic volumes collected as part of the First-Stage PUD. A figure comparing the volumes that were collected in 2017 to those collected in 2010 is included in the Appendix. Since 2010 there has been a general increase in volumes throughout the study area, except a significant drop in eastbound through volumes along Maine Avenue during the AM peak and in westbound through volumes along Maine Avenue during the PM peak. As such, those volumes were adjusted upwards to the 2010 volumes and balanced between intersection where necessary (to fall within +/- 50 vehicles per hour). For all intersections, the morning and afternoon system peak hours were used.

In addition, traffic entering and exiting the Phase 1 construction site, or Phase 1 construction offices which are present on the Phase 2 site were removed. Since the exact origin or destination of the Phase 1 construction related trips was unknown, trips were only removed at the site access points and not from adjacent intersections, which is a more conservative approach.

2022 Background Traffic Volumes (without Phase 1 or Phase 2 of the project)

The traffic projections for the 2022 Background conditions consist of the existing volumes with two additions:

- Traffic generated by developments expected to be completed prior to the project (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, six (6) developments were included in the 2022 Background scenario. These developments are:

1. 680 Eye Street SW
2. The View at Waterfront
3. 1001 4th Street SW
4. 1000 4th Street SW
5. 375 M Street SW
6. 425 M Street SW
7. 301 M Street SW

There are existing studies available for many of these developments, but for those with no existing studies, trip generation was calculated based on the Institute of Transportation Engineers' *Trip Generation Manual*, 9th Edition, with mode splits based on those used for similar developments in the Southwest neighborhood. Trip distribution assumptions for the background developments were based on those determined for the Wharf development and altered where necessary based on anticipated travel patterns. Mode split and trip generation assumptions for the background developments are shown in Table 9.

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 (MWCOC) currently adopted regional transportation model, comparing the difference between the year 2017 and 2025 model scenarios as vetted and agreed to by DDOT. The growth rates observed in this model served as a basis for analysis assumptions, and where negative growth was observed, a conservative 0.10 percent annual growth rate was applied to the roadway. The applied growth rates are shown in Table 10.

The traffic volumes generated by background developments and by the inherent growth along the network were added to the existing traffic volumes in order to establish the 2022 Background traffic volumes. The traffic volumes for the 2022

Background conditions are shown on Figure 35, Figure 36, and Figure 37.

2022 Interim Traffic Volumes (with Phase 1 of the project)

The 2022 Interim traffic volumes consist of the 2022 Background volumes with the addition of the traffic volumes generated by Phase 1 of the Wharf (Phase 1-generated trips). Thus, the 2022 Total Future traffic volumes include traffic generated by: the existing volumes, background developments, the inherent growth on the study area roadways, and Phase 1 of the Wharf.

Trip distribution assumptions for Phase 1 of the Wharf were based on those determined for Phase 2 of the Wharf and altered where necessary based on anticipated travel patterns.

It should be noted that Parcel 11 (525 Water Street), which is part of Phase 1 of the Wharf, was occupied and operational when counts were conducted in May and June of 2017. As those trips are already accounted for on the network, the Parcel 11 was not included in the Phase 1 trip generation.

The Phase 1-generated traffic volumes are shown on Figure 38, Figure 39, and Figure 40, and the 2022 Interim traffic volumes are shown on Figure 41, Figure 42, and Figure 43.

2022 Future Traffic Volumes (with Phase 1 and Phase 2 the project)

The 2022 Future traffic volumes consist of the 2022 Interim traffic volumes with the addition of Phase 2-generated traffic. Thus, the 2022 Future traffic volumes include traffic generated by: existing volumes, background developments, inherent growth on the study area roadways, and full buildout including Phase 1 and Phase 2 of the Wharf.

Trip distribution for the site-generated trips was determined based on: (1) CTPP TAZ data, (2) existing and future travel patterns in the study area, and (3) the location of the underground parking garages of the development. Trip distributions were extensively vetted and agreed to by DDOT.

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 garages of Parcel 8 and Parcel 9.



The office trip distribution was significantly influenced by the CTPP TAZ flow data for drivers commuting to the site's TAZ and

adjusted based on traffic volumes and patterns. The origin outbound and destination of inbound trips was the below-grade parking garages of Parcel 6, Parcel 7, and Parcel 10.

The retail trip was primarily based on the locations and proximity of other retail centers. Thus, the retail trip distribution is weighted more towards the east and west relative to the residential trip distribution. The origin of outbound and destination of inbound retail vehicular trips was the below-grade parking garages of Phase 2 of the Wharf.

The hotel trip distribution was mostly based on the locations of major routes used by visitors to the District, the locations of major airports in the area such as BWI, DCA, and IAD, major through routes such as I-95/395/495, and the locations of popular tourist attractions, mostly located north of the site. The origin of outbound and destination of inbound hotel vehicular trips was the below-grade parking garage of Parcel 8.

The trip distribution assumptions for the live-aboard residents of the 94 boat slips of the Wharf Marina was the same as the residential trip distribution. The origin of outbound and destination of inbound vehicular trips belonging to live-aboard tenants at the Wharf Marina was the below-grade parking garages of Phase 2.

The trip distribution assumptions for the recreational boat slips at the Wharf Marina was significantly influenced by CTPP TAZ flow data for drivers commuting from the site's TAZ during the morning and CTPP TAZ flow data for drivers commuting to the site's TAZ during the afternoon. As these assumptions reflect traffic patterns during the morning and afternoon of a typical workday, flow patterns associated with commuters going to work after using their boats during the morning and commuters going to use the recreational boat slips after work was most appropriate. The origin of outbound and destination of inbound vehicular trips belonging to the recreational boat slips at the Wharf Marina was the below-grade parking garages of Phase 2.

Based on this review and the site access locations, the site-generated trips were distributed through the study area intersections. A summary of trip distribution assumptions and specific routing is provided on Figure 44 and Figure 46 for

outbound trips and on Figure 45 and Figure 47 for inbound trips.

The traffic volumes for the 2022 Future conditions were calculated by adding the development-generated traffic volumes to the 2022 Interim traffic volumes. Thus, the future condition with the proposed development scenario includes traffic generated by: existing volumes, background developments through the year 2022, inherent growth on the network, and the proposed development. The Phase 2 site-generated traffic volumes are shown on Figure 48, Figure 49, Figure 50, and the 2022 Future traffic volumes are shown on Figure 51, Figure 52, and Figure 53.

Geometry and Operations Assumptions

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

2022 Background Geometry and Operations Assumptions (without Phase 1 or Phase 2 of the Wharf)

The geometry and operations assumed in the Background conditions scenario are those present when the main data collection occurred with a few exceptions. 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.

Following national and DDOT methodologies, a background geometry improvement must meet the following criteria to be incorporated into the analysis:

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

Based on these criteria, a number of geometry improvements were included in the 2022 Background scenario. Roadway improvements that were approved as part of Phase 1 of the Wharf, the 680 Eye Street SW development, and the Banneker Park Pedestrian Improvements Plan were incorporated into the Background conditions scenario. Detailed plans are included in the Technical Appendix.

Coinciding with the construction of Phase 1, new striping along Maine Avenue will reduce the number of travel lanes in both eastbound and westbound directions. Exclusive left turn lanes



and new pedestrian crossings will be added the intersections of Maine Avenue and 9th Street and Maine Avenue and 7th Street.

Coinciding with the development of the 680 Eye Street SW development, the intersection of 7th Street and I Street SW will be reconfigured. The northbound channelized right turn will be removed and one of the northbound thru lanes will become a thru-right.

Alongside the Banneker Park Pedestrian Improvements, the channelized southbound right at the intersection of 9th Street and Maine Avenue will be removed.

No changes to signal timings were made.

The lane configurations and traffic controls for the Background conditions are shown on Figure 54, Figure 55, and Figure 56.

2022 Interim Geometry and Operations Assumptions (with Phase 1 of the Wharf)

The geometry and operations assumed in the 2022 Interim conditions are based on the 2022 Background conditions with the addition of Phase 1 of the Wharf. Along Maine Avenue, the three new and two modified access points, where internal roadways associated with Phase 1 intersect Maine Avenue were added; these are as follows:

1. Maine Avenue and Blair Alley is a new access point that will have unsignalized right-in and right-out access.
2. Maine Avenue and 9th Street/District Square is an existing intersection that will provide full signalized access to a new internal roadway (District Square).
3. Maine Avenue and Sutton Square is a new access point that will have unsignalized right-in and right-out access.
4. Maine Avenue and Pearl Street is a new access point that will have unsignalized right-out access, except for some loading and trash trucks that will be allowed to turn into Pearl Street from Maine Avenue.
5. Maine Avenue and 7th Street is an existing intersection that provide full signalized access to 7th Street Park, which connects Phase 1 and Phase 2 of the Wharf.

No signal timing changes were made. The existing signals at the intersections of Maine Avenue and 9th Street, and Maine

Avenue and 7th Street are programmed so that the northbound and southbound movements run concurrently.

Lane configurations and traffic controls for the 2022 Interim conditions are shown on Figure 57, Figure 58, and Figure 59.

2022 Future Geometry and Operations Assumptions (with Phase 1 and Phase 2 of the Wharf)

The geometry and operations assumed in the 2022 Future conditions are based on the 2022 Interim conditions with the addition of Phase 2 of the Wharf as shown previously in Figure 25. Along Maine Avenue, seven access points, where internal roadways meet Maine Avenue, will provide vehicular access to Phase 2 of the Wharf. These are as follows:

1. Maine Avenue and 7th Street is an existing intersection that will provide full signalized access to 7th Street Park, which connects Phase 1 and Phase 2 of the Wharf. This access point will be used by Phase 1 of the Wharf and for Parcel 6 loading. This access point is under construction and will open with Phase 1 of the Wharf.
2. Maine Avenue and The Oculus will have right-in and right-out access. This access point will be used for limited access for the Parcel 6 loading berth and for drop-off and pick-up associated with the Parcel 6 and Parcel 7 office components.
3. Maine Avenue and The Alley will have right-in and right-out access. This access point will primarily be used by vehicles entering or exiting the Parcel 7 garage entrance, as well as loading for Parcels 7 and 8.
4. Maine Avenue and Marina Way will provide full signalized access from Maine Avenue. This access point will primarily be used for vehicles to access the Parcel 8 garage entrance, the valet and drop-off/pick-up areas in front of the hotel and residential lobby of Parcel 8, the valet area in front of the Parcel 8 retail pavilion, and loading for Parcel 9. In addition, it is assumed that the majority of vehicles coming to Phase 2 of the Wharf from southeast will use this access point.

This is an improvement over the First-Stage access plan, which included a signalized intersection at Water Street. Based on anticipated peak hour volumes after full buildout, this intersection triggers the need for a signal. A signal



warrant for this intersection is included in the Technical Appendix.

5. Maine Avenue and Wharf Street will have right-in access. This access point will primarily be used by vehicles using the condo-only car lift in Parcel 9.
6. Maine Avenue and Water Street will have right in and right-out access. This access point will primarily be used by vehicles entering or exiting the Parcel 10 garage entrance, as well as loading for Parcel 10. This access point currently exists, and services Parcel 11.
7. Maine Avenue/M Street and 6th Street is an existing intersection with full signalized access. This intersection provides access to Parcel 11, and will provide access to the Parcel 10 garage access and Parcel 10 loading facilities.

No signal timing changes were made to existing signals. Signal timings for the new signal at the intersection of Maine Avenue and Marina Way were based surrounding intersections and adjusted for projected peak hour volumes.

Lane configurations and traffic controls for the 2022 Future conditions are shown on Figure 60, Figure 61, and Figure 62.

Vehicular Analysis Results

Intersection Capacity Analysis

Intersection capacity analyses were performed for the three scenarios outlined previously at the intersections contained within the study area during the morning and afternoon peak hours. Synchro version 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 Appendix.

Table 11 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the 2022 Background, 2022 Interim, and 2022 Future scenarios.

The majority of the study intersections operate at acceptable conditions during the morning and afternoon peak hours for the 2022 Background, 2022 Interim, and 2022 Future scenarios; however, four (4) intersections operate at levels beyond acceptable thresholds during all scenarios in one or more peak hour:

- Maine Avenue/14th Street Bridge On-Ramp (AM and PM)
- Maine Avenue/14th Street Bridge Off-Ramp (PM)
- Maine Avenue/9th Street (AM and PM)
- M Street/4th Street (AM and PM)

The following study intersections operated at levels beyond acceptable thresholds during the morning and afternoon peak hours for the 2022 Future scenario:

- Maine Avenue/7th Street (PM)
- Maine Avenue/6th Street (PM)

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 12 shows the queuing results for the study area intersections. Ten (10) of the study intersections have a lane



group that exceeds its storage length during at least one peak hour in all of the study scenarios. These intersections are as follows:

- Maine Avenue/14th Street Bridge On-Ramp (AM and PM)
- Maine Avenue/14th Street Bridge Off-Ramp (AM and PM)
- Maine Avenue/12th Street (AM and PM)
- Maine Avenue/9th Street (AM and PM)
- Maine Avenue/7th Street (AM and PM)
- Maine Avenue/6th Street (PM)
- M Street/4th Street (AM and PM)
- 7th Street/Frontage Road (AM and PM)
- 7th Street/I-395 On-Ramp (AM and PM)
- 7th Street/G Street (AM and PM)

Additionally, one intersection has a lane group that exceeds its storage length during at least one peak hour in the Interim and Future scenarios:

- 4th Street/I Street (PM)

With the addition of the site-generated traffic, queues are slightly increased at all of the study intersections, but no major impacts are seen as a result of the development. Five (5) intersections experience and increase in 95th percentile queues large enough to require that mitigations be explored, and are discussed in the next section.

Mitigations

Based on DDOT standards, the proposed development is considered to have an impact at an intersection within the study area if the capacity analyses show an LOS E or LOS F, or where the 95th percentile queues increase 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 conditions. The development is also considered to have an impact if there is an increase in delay at any approach or the overall intersection operating under LOS E or F of greater than 5 seconds, when compared to the background condition. Following these guidelines, there are impacts to seven (7) intersections that trigger the need to explore mitigations as a result of the development. Mitigation measures were tested at these intersections, with results shown on Table 13 for LOS mitigations and Table 14 for 95th percentile queuing mitigations, with detailed Synchro reports included in the Appendix. The following conclusions were made:

- *Maine Avenue & 14th Street Bridge On-Ramp*
Under the 2022 Background, Interim, and Future conditions, delays along the westbound and southbound approaches of Maine Avenue and the Bureau of Fiscal Service driveway operate at LOS E or LOS F during the morning and afternoon peak hours. In addition, the 95th Percentile queuing for the westbound right lane is also shown to increase by more than 150 feet during the afternoon study period. While site-generated trips exacerbate these failing conditions, it should be noted that approximately 2,000 vehicles per hour use the westbound right onto the 14th Street Bridge on-ramp under background conditions.

Signal timing adjustments were made to the intersection during the morning peak hour which reduced delays along the westbound approach to levels similar to background conditions. Signal timing adjustments could not reduce delays in the afternoon peak hours however, as the intersection is at capacity.

The recommended mitigations have no negative impact on the amount of time pedestrians need to cross the intersection.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix.

DDOT, the SW BID, and the Applicant are currently studying this area (between the intersection of 12th Street and Maine Avenue, and Maine Avenue and the 14th Street Bridge on-ramp, including the weaves and merges in between them) and are looking for operational and/or geometric solutions. This includes encouraging drivers to use alternate routes to 14th Street and modifications to help local traffic exit the area. This report defers to these efforts and the solutions they develop.

- *Maine Avenue & 14th Street Bridge Off-Ramp*
Under 2022 Future conditions, delays for the overall intersection and northbound approach of the 14th Street Bridge off-ramp are projected to increase by more than 5 seconds over the 2022 Background conditions, which operates at LOS F during the afternoon peak hour.

This can be mitigated through signal timing adjustments. Signal timing adjustments were made during the afternoon peak hour to allow more green time for northbound right



vehicles turning onto eastbound Maine Avenue. This reduced vehicular delays to levels similar to the background condition.

The actuated signal allows more time to be allocated to eastbound traffic whenever possible. This report looked into converting the intersection into a pre-timed signal. Although northbound approach delays were reduced, the eastbound approach saw degradation approaching LOS E, as such, this report defers to DDOT on potential solutions.

The recommended mitigations have no negative impact on the amount of time pedestrians need to cross the intersection.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix.

- Maine Avenue & 9th Street

Under 2022 Future conditions, delays are projected to increase by more than 5 seconds over the 2022 Background conditions during the morning (LOS F) and afternoon (LOS F) peak hours for the southbound approach, and for the overall intersection (LOSE E) during the afternoon peak hour. Overall delay for the intersection is projected to increase to LOS E during the morning peak hour.

The addition of site-generated trips from Phase 1 and Phase 2 of the Wharf resulted in delays greater than 5 seconds in the southbound and overall approach for the intersection. As the problematic turning movement was the high number of southbound left turns (420 vehicles in the AM peak hour and 573 vehicles in the PM peak hour), this report explored reconfiguring the southbound approach to accommodate the large amount of southbound left turn traffic. The existing lane configuration of a southbound left, southbound thru, and southbound right was converted to a dual southbound left and a southbound thru-right. This restriping allows for greater southbound left capacity while maintaining the existing cross-section of three travel lanes. The addition of a second southbound left lane requires a protected southbound left turn phase for pedestrian safety and vehicle throughput. The resulting signal modification was then optimized and offset to allow for the best overall intersection delay.

The recommended mitigation reduces the amount of time pedestrians would receive to cross the eastern leg of the intersection. The Applicant is willing to review this condition with DDOT, and if DDOT disagrees and thinks the double left turn lane is not preferable, the Applicant is willing to forgo the change.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix.

- Maine Avenue & 7th Street

Under 2022 Future conditions, delays along the southbound approach of 7th Street are projected to increase to LOS E during the afternoon peak hour. This is a result of a shared phase between northbound and southbound traffic where vehicles making a southbound left must yield to northbound thru traffic before turning.

This can be mitigated through signal timing adjustments to allow for more green time for the northbound-southbound phase.

In addition, the westbound approach was adjusted to allow for a protected westbound u- and left-turn phase, which will accommodate the future cycle tracks. While not a mitigation, this recommended improvement was added when this report explored mitigations at this intersection.

The recommended mitigations have no negative impact on the amount of time pedestrians need to cross the intersection.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix

- Maine Avenue/M Street & 6th Street

Under 2022 Future conditions, delays along the eastbound approach of 6th Street are projected to increase to LOSE E during the afternoon peak hour.

A number of mitigations were explored for this intersection including signal timing adjustments. Given the distance that pedestrians need to cross the eastern and western leg of the intersection, adjusting signal timing would result in too little time for pedestrians to cross, and was thus excluded as a possibility. As such, geometric improvements were considered next, which identified that



the main constraint of the eastbound approach is that there are only two (2) eastbound lanes.

Two possible geometric improvements were explored, which would result in acceptable operations at this intersection:

1. Removing parking to provide three (3) eastbound lanes by not allowing parking during rush hour at the six (6) parking spots on the southern block face of the eastbound approach.
2. Removing parking to provide three (3) eastbound lanes by permanently removing two (2) parking spots from the southern block face of the eastbound approach.

Either of these options would result in the addition of a thru-right lane, which works because the three (3) eastbound lanes have three (3) receiving lanes. Overall delays are reduced significantly in either mitigation strategy. The Applicant is willing to commit to any of these recommendations with DDOT approval, but prefers restricting parking during the PM peak period. This report defers to DDOT on the appropriate solution.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix.

- 7th Street & Frontage Road
Under 2022 Future conditions, 95th Percentile queuing for the westbound left lane is shown to increase by more than 150 feet during the morning study period which exceeds its storage length in 2022 Background condition.

This can be attributed to the addition of Wharf Phase 1 and 2 site trips and the phasing of the signal, which allows permitted westbound left turns to be made during gaps in eastbound thru and right traffic.

This impact can be mitigated through signal timing adjustments to give the eastbound/westbound phase of Frontage Road more green time to allow for more vehicles to pass the signal, reducing 95th Percentile queueing to mitigated levels.

The recommended mitigations have no negative impact on the amount of time pedestrians need to cross the intersection.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix.

- 7th Street & I-395 On-Ramp
Under 2022 Future conditions, 95th Percentile queuing for the northbound thru-right lanes are shown to increase by more than 150 feet during the afternoon study period, which exceeds its storage length in the 2022 Background scenario.

This can be attributed to the addition of Wharf Phase 1 and 2 site trips and the storage length of the northbound approach, which is already exceeded during background conditions.

This impact can be mitigated through signal timing adjustments to give the northbound thru phase of 7th Street more green time to allow for more vehicles to pass the signal, reducing 95th Percentile queueing to mitigated levels.

The recommended mitigations have no negative impact on the amount of time pedestrians need to cross the intersection.

Synchro files were provided to DDOT and detailed analysis worksheets are included in the Technical Appendix.

Maine Avenue and Site Roadway Intersections

The capacity analysis shows that all intersections of Maine Avenue with the new internal street network s operate at acceptable conditions. One (1) new site access point triggers the need for a traffic signal. The signal warrant is included in the Technical Appendix.

Summary and Recommendations

In completing the technical capacity analyses, this report noticed several overall trends. The growth in traffic volumes projected within the study area do not overlap where volumes were highest earlier this decade (i.e. compared to the traffic counts from the Stage 1 Traffic Study which were collected in 2010). There has been significant growth in volumes in the intervening years on other movements. This makes sense, as the regional traffic passing through the study area is generally



going in different directions than the new local traffic serving the study area and nearby locations like the Capitol Riverfront. The end result are traffic volumes that are more bi-directional than before.

As could be expected, the main delay and queuing areas of concern identified in this CTR follow a trend of where regional and local volumes overlap the most. The capacity analysis results at the intersections of Maine Avenue/14th Street On-Ramp, Maine Avenue/9th Street, and Maine Avenue/7th Street, show this trend. Traffic generated by The Wharf is overlapping with regional traffic and traffic going to and from Southwest DC, and the Capitol Riverfront areas. The majority of vehicular capacity concerns in the study area can be alleviated through signal timing changes that adapt of the changes in volume patterns, but at some locations, operational changes alone cannot mitigate future delays.

It is likely that drivers will alter their patterns as future conditions change. The main issue at the Maine Avenue/14th Street On-Ramp intersection are the thousands of cars per hour in the evening trying to get on the 14th Street bridge. There are other options to reach 14th Street, and drivers will likely adjust. Similarly, high delays at the intersection of Maine Avenue and 9th Street are partly due to the large amount of southbound left turns. These drivers have other options to reach Maine Avenue, and will likely also adjust their patterns.

As has been stated in prior reports done throughout this area of the District, an essential component for good traffic operations in this area will be to minimize the vehicular trip generation of new development, thus reducing the overlap between new local traffic and regional traffic. The Wharf has been planned from the beginning to be a heavily multi-modal development with a low vehicular trip generation. Instead of investing in widening roadways to alleviate capacity concerns, the strategy has been to minimize volumes to avoid capacity problems. This is also because widening roadways and adding more vehicular capacity is not feasible nor desirable (due to the negative impact it can have on other modes).

As such, the multi-modal improvements described in this report are indirectly mitigating traffic operations impacts. One notable improvement is the new traffic signal at Marina Way and Maine Avenue. The new traffic signal provides a good location for Phase 2 traffic to enter on and off Maine Avenue. Based on the technical analysis results, the placement of the

new traffic signal will have capacity benefits for the intersections of 9th, 7th and 6th Streets with Maine Avenue, as it will help avoid making any of these issues worse by limiting the amount of Phase 2 related traffic turning at those intersections.

In addition to these improvements, this report recommends DDOT review several mitigations measures for traffic operations:

- Adjusting signal timings throughout the study area to adapt to changes in volumes.
- Exploring creating a double-left turn southbound at 9th Street's approach to Maine Avenue.
- Restricting parking along Maine Avenue during the afternoon peak hour at its eastbound approach to 6th Street in order to create a short through/right turn lane.

The Applicant is willing to provide these improvements as part of its Zoning Order commitments, given DDOT agreement on their implementation.



Table 9: 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 Wharf Phase 1	Based on approved TIS*	Total Trips	415	193	608	320	470	790
680 Eye Street SW	Based on approved TIS	Total Trips	42	69	111	70	54	124
The View at Waterfront	Based on approved TIS	Total Trips	23	80	103	92	63	155
1001 4th Street SW	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
1000 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
425 M Street SW	Based on approved CTR scoping form	Total Trips	29	59	88	66	52	118
375 M Street SW	Based on approved CTR scoping form	Total Trips	31	60	91	70	52	122
301 M Street SW	Based on approved TIS	Total Trips	14	55	69	54	29	83
Net Background Site Trips			603	642	1,245	837	839	1,677

*Mode split assumptions for the Wharf Phase 1 were based on those contained in its approved TIS. Trip generation calculations are based on the constructed development program, and not the development program contained in the TIS.

Table 10: Applied Annual and Total Growth Rates

Road & Direction	Annual Growth Rate		Total Growth between 2017 and 2022	
	AM Peak	PM Peak	AM Peak	PM Peak
Maine Ave SW – Northbound	0.50%	1.00%	2.53%	5.10%
Maine Ave SW – Southbound	2.00%	0.25%	10.41%	1.26%
4 th St SW – Northbound	0.50%	0.50%	2.53%	2.53%
4 th St SW – Southbound	2.00%	0.50%	10.41%	2.53%
6 th St SW – Northbound	1.25%	0.75%	6.41%	3.81%
6 th St SW – Southbound	0.10%	0.25%	0.50%	1.26%
7 th St SW – Northbound	1.00%	2.00%	5.10%	10.41%
7 th St SW – Southbound	2.00%	1.75%	10.41%	9.06%
9 th St SW – Southbound	2.00%	1.50%	10.41%	7.73%
I St SW – Eastbound	2.00%	0.75%	10.41%	3.81%
I St SW – Westbound	1.50%	2.00%	7.73%	10.41%
M St SW – Eastbound	2.00%	0.25%	10.41%	1.26%
M St SW – Westbound	0.50%	1.50%	2.53%	7.73%
All Others	0.10%	0.10%	0.50%	0.50%

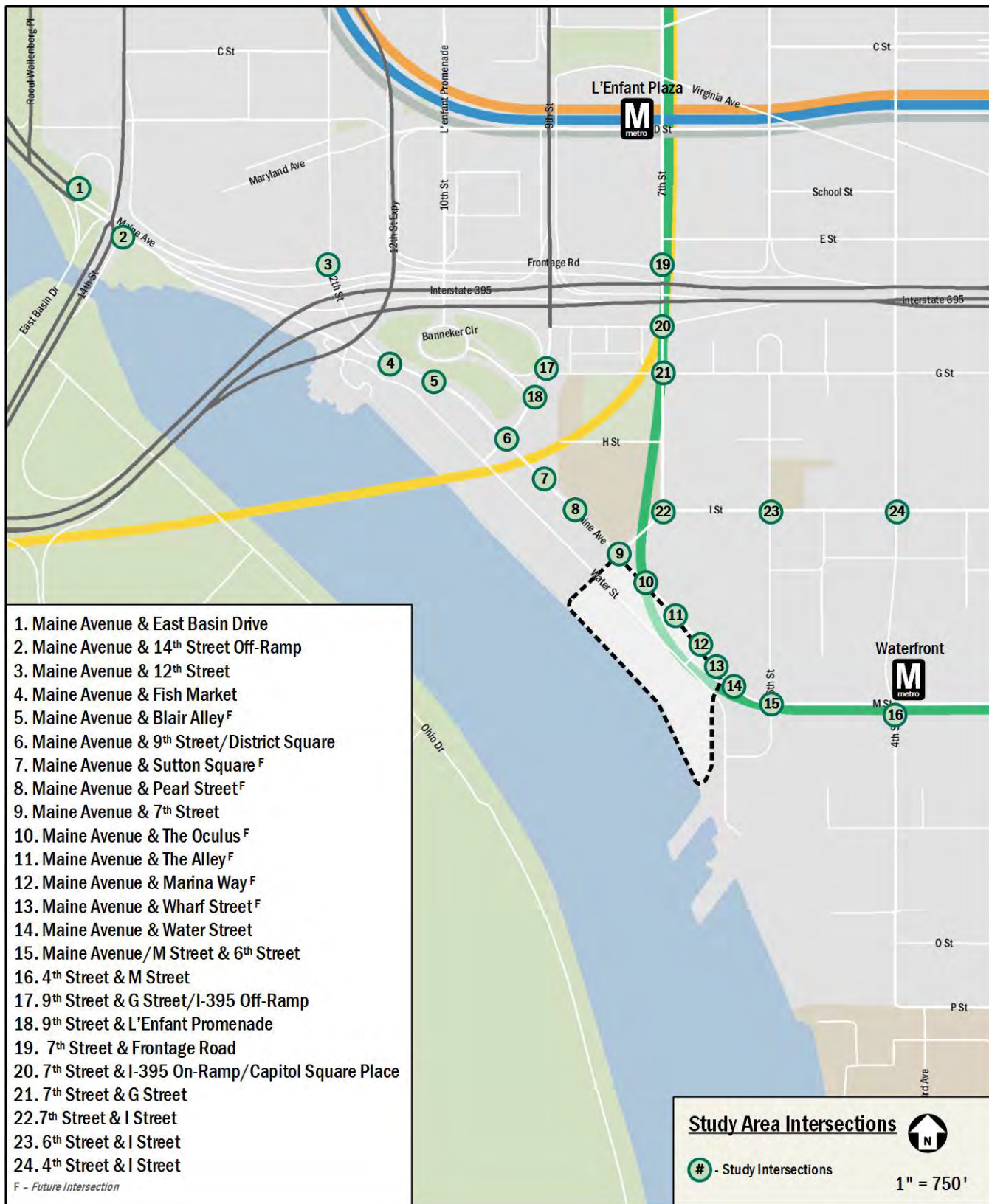


Figure 34: Study Area Intersections

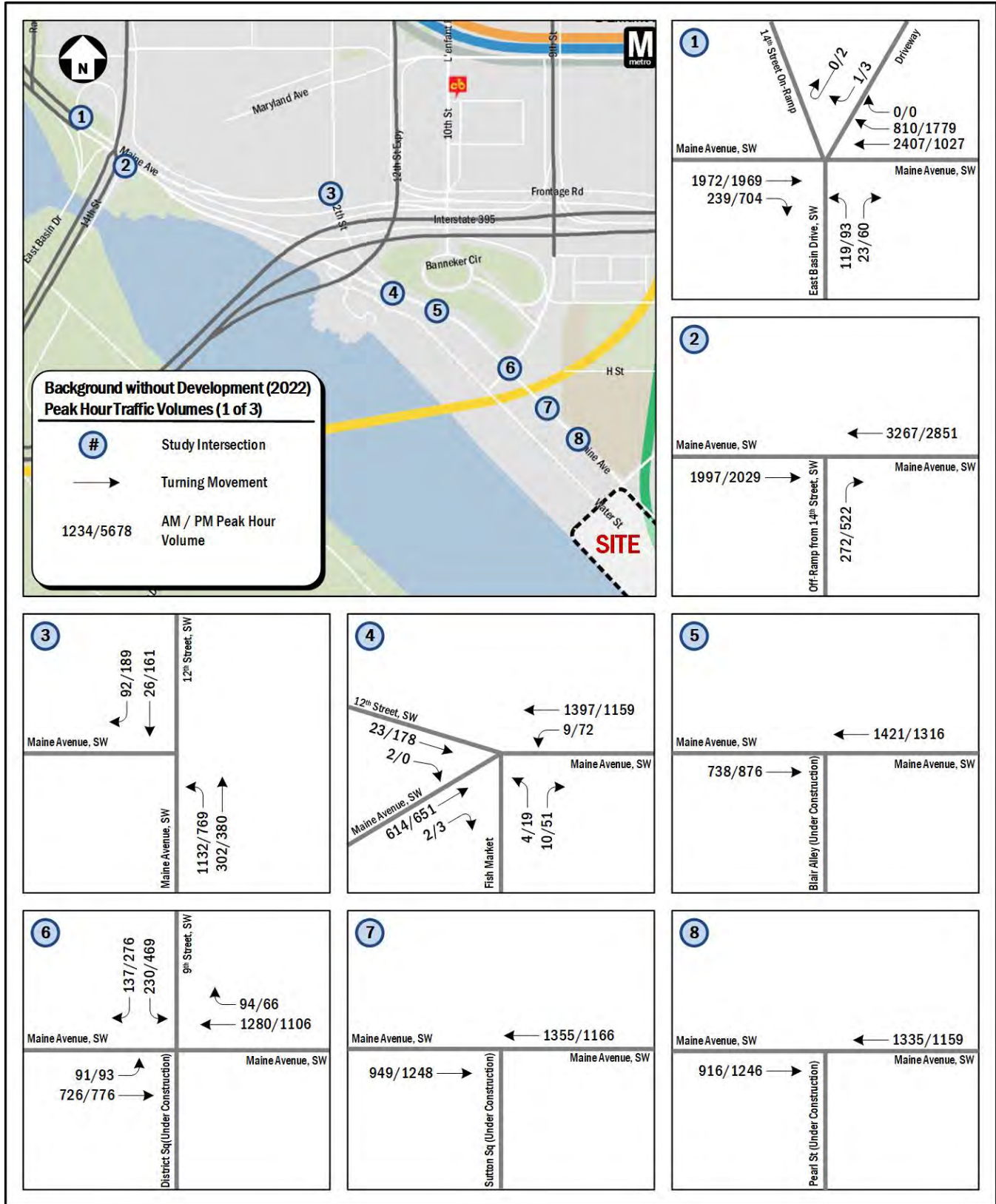


Figure 35: 2022 Background Peak Hour Traffic Volumes (1 of 3)

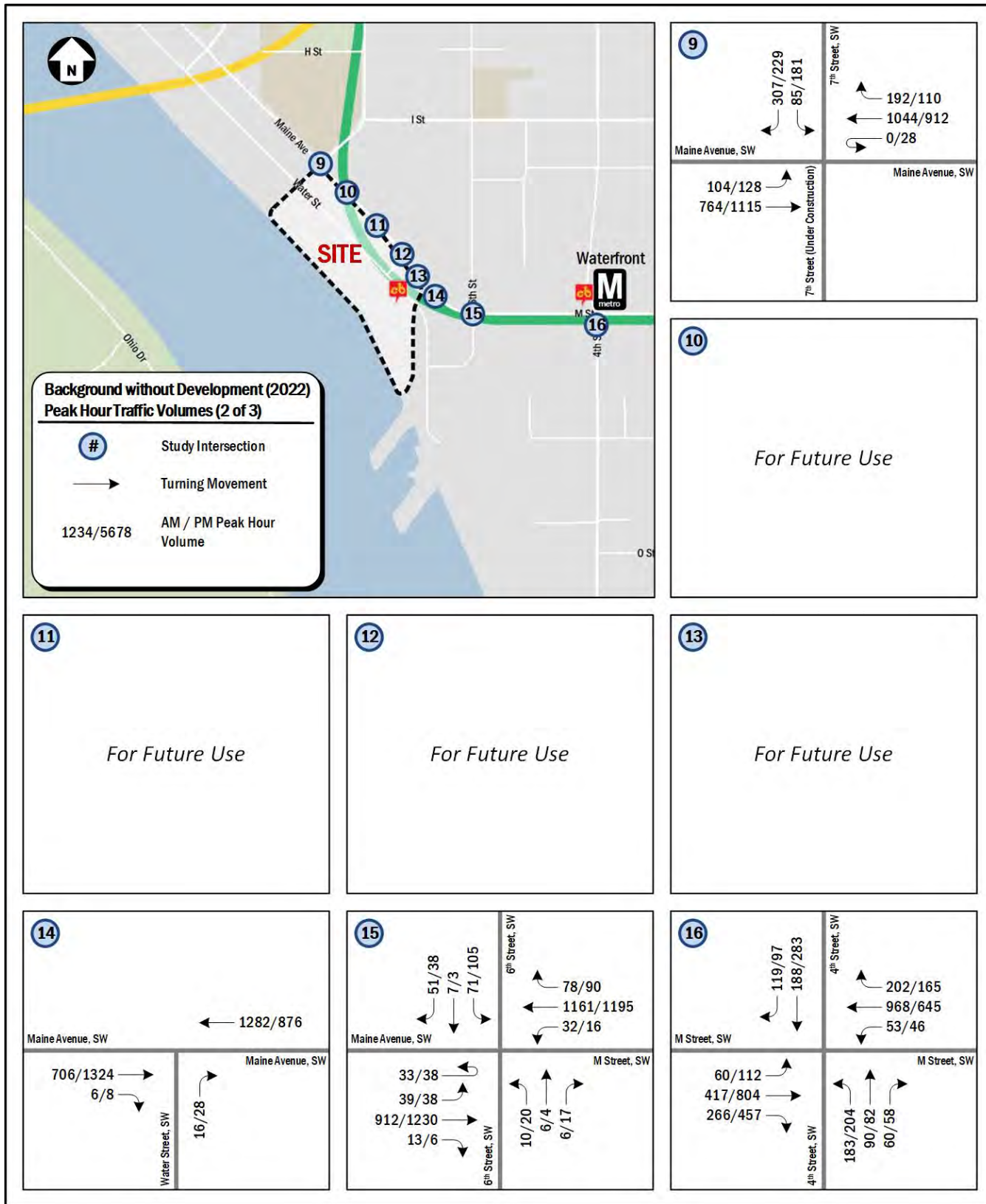


Figure 36: 2022 Background Peak Hour Traffic Volumes (2 of 3)

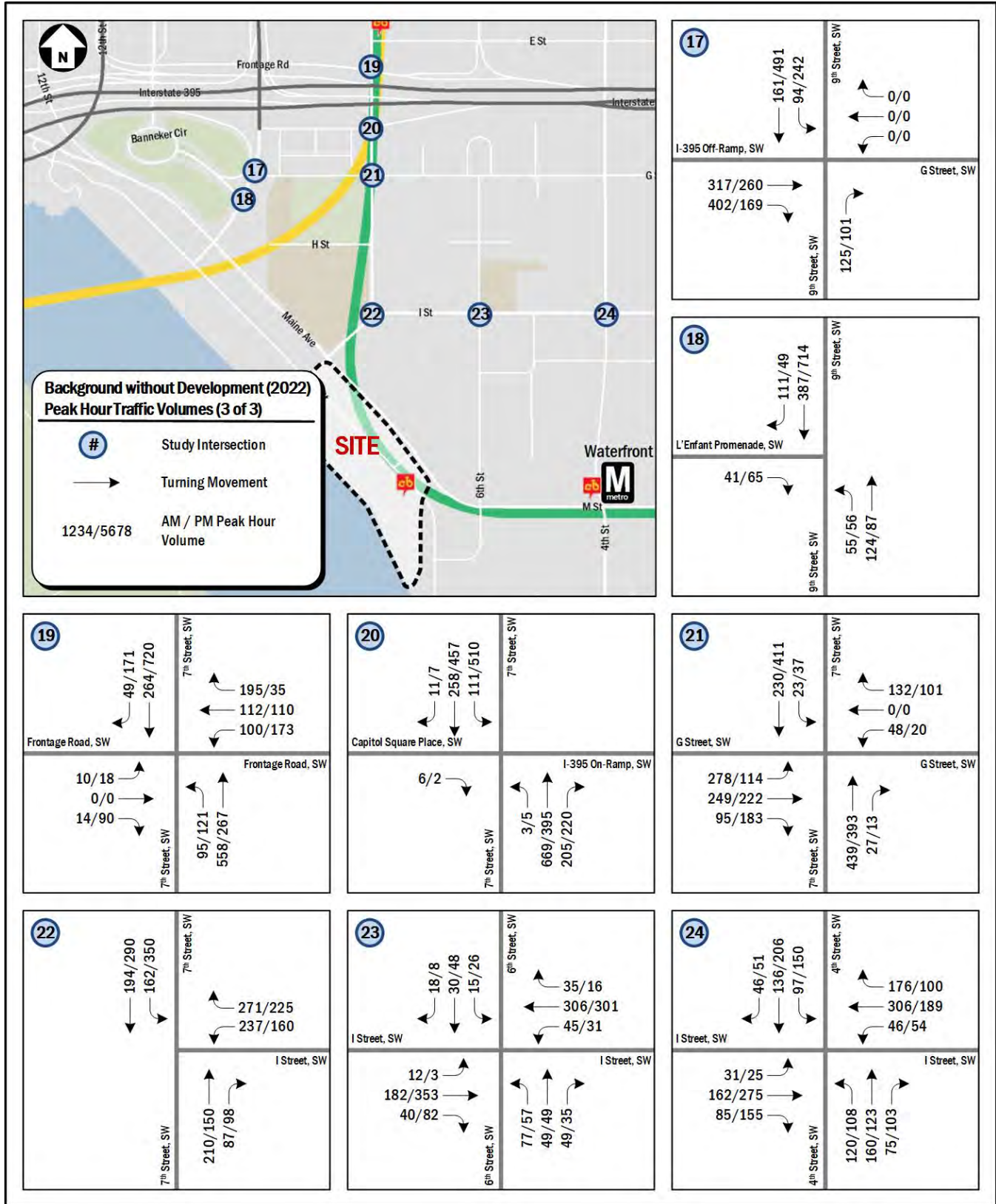


Figure 37: 2022 Background Peak Hour Traffic Volumes (3 of 3)