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Transportation Impact Study

**DC Water Occupied Sites  
Planned Unit Development**

Washington, DC

June 12, 2013



**GOROVE / SLADE**

Transportation Planners and Engineers

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## EXECUTIVE SUMMARY

The following report presents the findings of a Transportation Impact Study (TIS) performed for the DC Water Occupied Sites Planned Unit Development (PUD). The proposed PUD is located within Ward 6 along 1<sup>st</sup> Street SE, near the Anacostia River and the Washington Nationals Ballpark. The proposed site plan consists of a mixed-use development with a 16-screen movie theater, two residential towers, ground-level retail, and a small park with adjacent retail space, with approximately 951,000 square feet of overall development.

### Design Review

The proposed site is located within a high-quality transportation network, with excellent access to local and regional roadways, both rail and bus transit, quality bicycle connections, and pedestrian accommodations. The transportation features of the site plans were designed to take advantage of the transportation network surrounding the site and conform to DDOT's general guidelines.

The development program consists of a mixed-use development, with approximately 45,000 SF retail uses, the movie theater, and 600 residential dwelling units. In summary, the site plans include the following features:

- The PUD is divided into four parcels. Parcel F1 will contain the Movie Theater, Parcels G1 and G2 will contain all of the Residential and most of the Retail uses, and Parcel G3 will contain the remaining Retail uses.
- Vehicular access to the site will be provided via N Place and private internal streets to be constructed as O Street and 1½ Street that are planned to intersect 1<sup>st</sup> Street and N Place.
- Curb cuts will be provided via N Place, O Street, and 1½ Street. One curb cut is proposed along N Place east of 1½ Street, which will provide access to Parcel F1 and a second curb cut is proposed along N Place between 1<sup>st</sup> Street and 1½ Street, which will provide loading access to Parcel G1. The other curb cuts will be internal to the site, including one curb cut proposed along 1½ Street and two proposed along O Street to provide access to Parcels F1, G1, and G2.
- Loading docks will be provided for each developed parcel, except Parcel G3. Loading and service facilities will be designed and located to minimize conflicts with the pedestrian environment or vehicular and bicycle traffic.
- The amount of parking provided will be sufficient without the unintended consequence of encouraging driving as a mode. The proposed development will provide 300 parking spaces for the residential uses and 337 spaces for the non-residential uses (637 spaces total).
- The project will include short-term public bicycle spaces on sidewalks and near building entrances and secured long-term bicycle parking within the parking garages. Short term parking will be provided in Parcels F1, G1, and G2, with 44 spaces on Parcel F1, 10 on Parcel G1, and 10 on Parcel G2. An additional 205 long-term parking spaces are planned for Parcel G1 and G2, located within the residential parking garages.

The Transportation Demand Management (TDM) plan for the DC Water PUD is based on the DDOT expectations for TDM programs, modified to allow for performance monitoring. The Applicant proposes the following TDM measures:

- The Applicant will comply with Zoning requirements to provide bicycle parking/storage facilities. This includes secure bicycle parking located in the garage for retail employees and long-term storage for residents.
- The Applicant will unbundle all parking costs from the cost of lease or purchase of residential units.
- Public parking costs will be set at no less than the charges of the lowest fee garage located within ¼ mile.

- The Applicant will identify a TDM Leader for the project (for planning, construction, and operations) and provide this information to DDOT and Zoning Enforcement.
- The Applicant will provide a Transportation kiosk in the residential lobbies, which will contain printed materials related to local transportation alternatives and will maintain a stock of materials at all times.
- The Applicant will provide website links to CommuterConnections.com and goDCgo.com on developer and property management websites.
- The Applicant will dedicate a total of two spaces on the G1 and/or G2 parcels for car sharing services to use with right of first refusal. These spaces will be available to members of the car sharing 24 hours a day, seven days a week, without restrictions.
- The Applicant will provide an on-site business center available to residents, which will provide access to internet services.
- The Applicant will work with DDOT to determine if a Capital Bikeshare station is desirable and feasible for the project site. If so, the Applicant will provide a location for a Capital Bikeshare station.
- Two years after the entire project is 90% occupied, the Applicant will perform a monitoring study of site trip generation. The site trips will be compared to the projected trip generation contained in this report. If the measured trip generation exceeds the projections, the Applicant will supplement the above TDM measures with additional ones, such as those from in *Incorporation of Transportation Demand Management (TDM) into the Development Review Process* suggested for a project of this size not listed above.

### **Roadway Capacity Review**

Given the dynamic nature of the neighborhood surrounding the site and the unique demands of a cinema use within the project, impacts were evaluated for not only the typical AM and PM weekday peak periods, but also Saturday evening peak periods (in conjunction with potential cinema operations) and a weekday evening peak period when a Washington Nationals game was underway. In addition, the study area encompassed an area stretching as far east as 5<sup>th</sup> Street, SW, north to I (Eye) Street, west to South Capitol Street, and south to the Anacostia River.

In order to determine the impact 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 under all of the conditions described above. These delays are compared to the acceptable levels of delay set by DDOT standards to determine the site's impact on the study area.

The analyses concluded that the DC Water PUD will not have an adverse impact on the surrounding transportation network. Traffic conditions are generally favorable within the study area, both with and without development in 2016 and in 2027, with the following exceptions:

- Due to the existing intersection configuration, the eastbound I Street approach to South Capitol Street is projected to operate under unacceptable levels of service during the morning under 2016 Background and Total Future as well as 2027 Horizon year conditions. In addition, this approach is anticipated to operate at LOS F during the PM peak hour in the 2027 Horizon year. Similar conditions are anticipated under game day conditions as well. Adjusting the lane configuration of the eastbound I Street approach to accommodate separate left and through-right lanes could relieve these delays. This report recommends that this intersection



be studied by DDOT outside the scope of this TIA in order to determine if improvements are warranted at this intersection.

- The intersection of South Capitol Street and M Street is planned to be consolidated from a grade-separated configuration into a single, at-grade intersection by the 2027 horizon year, alleviating the northbound South Capitol Street delays anticipated during the game day peak period under 2016 background and total future scenarios. Overall intersection delays are still anticipated in the 2027 horizon year during the AM peak period, primarily due to northbound through traffic. This report recommends that this intersection be studied by DDOT outside the scope of this TIA in order to determine if improvements are warranted at this intersection.
- As with the previous intersection, the intersection of South Capitol Street and N Street is planned to be consolidated by the 2027 horizon year, alleviating delays anticipated on southbound South Capitol Street and westbound N Street due to the existing configuration under existing and 2016 background and total future scenarios. This report recommends that this intersection be studied by DDOT outside the scope of this TIA in order to determine if interim improvements are necessary prior to the reconstruction of this intersection.
- The intersection of South Capitol Street and Potomac Avenue is planned to be reconstructed into a traffic oval by the 2027 horizon year, alleviating the overall delays anticipated at the intersection during the AM, PM, and Game Day peak hours under existing and 2016 background and total future conditions. With the construction of the traffic oval, westbound oval traffic is anticipated to see delays beyond acceptable levels during the PM and game day peak hours due to southbound through volumes on South Capitol Street. This report recommends that this intersection be studied by DDOT outside the scope of this TIA in order to determine if improvements are warranted at this intersection.
- The intersection of M Street and 1<sup>st</sup> Street operates within overall acceptable levels of service under all scenarios with the exception of the 2027 Horizon year game day peak hour. Background and site traffic as well as game day traffic propagate delays that are beyond acceptable levels along eastbound M Street and northbound 1<sup>st</sup> Street. A similar condition is anticipated to exist in 2027 during the PM peak period along northbound 1<sup>st</sup> Street, however, the overall intersection will continue to operate at an acceptable level of service during this condition. Retiming of the traffic signal would allow the intersection to operate acceptably during the 2027 Horizon year. *This report recommends that the Applicant coordinate with DDOT to retime the traffic signal at this intersection.*
- The intersection of N Street and New Jersey Avenue operates within overall acceptable levels of service under all scenarios with the exception of the 2027 Horizon year PM and game day peak hours. Background traffic, particularly from the Yards Parcels F, G, H, and I, combine with other background growth and site traffic resulting in unacceptable overall levels of service. The installation of a traffic signal at this location would alleviate these delays and would allow the intersection to operate at overall acceptable levels of service during the 2027 Horizon year. However, the efficiency of a traffic signal at this location would be determined by the ultimate configuration of the yet to be fully designed Tingey Square. *This report recommends that the Applicant coordinate with DDOT to install appropriate traffic control measures for the efficient operation of yet to be designed Tingey Square.*
- The intersection of M Street and 4<sup>th</sup> Street operates within overall acceptable levels of service under all scenarios. However, the northbound 4<sup>th</sup> Street approach is anticipated to operate at LOS F during the PM and game day peak hours in 2027. Since site trips account for a small percentage of the overall vehicular traffic at this intersection, the northbound delays result from other background growth within the study area. Retiming

of the traffic signal would allow the intersection to operate acceptably during the 2027 Horizon year. *This report recommends that the Applicant coordinate with DDOT to retime the traffic signal at this intersection.*

- As identified in previous studies, the delay along the stop-controlled southbound approach is due to the addition of trips generated along M Street by the background developments during the afternoon and game day peak hours. Although no site-generated trips are added to the southbound leg of this intersection, the addition of the site-generated through trips on M Street exacerbates this failing operation. 2027 Horizon year scenarios anticipate excessing southbound delays during the AM peak hour as well as overall delays during the afternoon and game day peak hours. Constructing a signal at this intersection allows for it to operate under acceptable conditions during all scenarios. This report recommends that this intersection be studied by DDOT outside the scope of this TIA in order to determine if future improvements are necessary as the area is developed.

### **Impact to Non-Auto Modes Review**

In addition to the vehicular capacity analysis, the following report examines transportation demand for all major modes of travel and includes trip generation projections for transit, bicycling, and walking. A review of projected demand and the local services came to the following conclusions:

- The DC Water PUD will not have a negative impact to local transit service. Based on findings presented in transit studies from WMATA and DDOT, both the Navy Yard Metrorail station and local bus services can accommodate the projected future ridership generated by the PUD.
- Based on the trip generation estimates for walking and the quality of the routes near the project's location, taking into account the streetscapes that will be redeveloped and improved, the PUD will not have a negative impact to pedestrian facilities in the study area.
- Based on the trip generation estimates for bicycling, and the quality of the routes near the project's location, the PUD will not have a negative impact to bicycle facilities in the study area.

## 1: INTRODUCTION

This report presents the findings of a transportation impact study performed for the DC Water Occupied Site PUD (DC Water PUD). The proposed PUD is located within Ward 6 along 1<sup>st</sup> Street SE, near the Anacostia River and the Washington Nationals Ballpark. The proposed site plan consists of a mixed-use development with a 16-screen movie theater, two residential towers, ground-level retail, and a small park with adjacent retail space, with approximately 951,000 square feet of overall development. In total, the development will include approximately 45,000 SF retail uses, the movie theater, and 600 residential dwelling units.

The purpose of this report is to:

1. Review the transportation elements of the development site plan, supplementing the material provided in the site plans that accompany the development application, and demonstrate that the site conforms to DDOT's general policies of promoting non-automobile modes of travel and sustainability. The Design Review section of the report covers this topic.
2. Provide information to the District Department of Transportation (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. The Impacts Review section of the report contains this analysis.
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. The report describes what improvements to the transportation network are needed to mitigate adverse impacts. The Impacts Review section of the report contains this analysis.

This report contains three sections as follows:

- *Introduction & Site Review*  
This section provides a summary of major transportation features near and adjacent to the DC Water PUD. This includes reviewing roadways, transit facilities, bicycle facilities, and future developments and District initiatives. This section contains information on the site to help establish a reference for the following sections.
- *Design Review*  
This section provides a summary of the internal transportation features of the DC Water PUD. This section is meant to supplement the details provided in the site plan package contained in the development application and reviews such items as the general parking strategy of the site, bicycle accommodations, and transportation demand management (TDM).
- *Impacts Review*  
This section provides a review of the impacts development of the DC Water PUD could have to each mode within the transportation network. For each mode, and where necessary, a list of recommendations and mitigation measures are compiled.

## 1.1 Site Location and Major Transportation Features

The DC Water PUD is located in the near Southeast portion of Washington, DC, in Ward 6. The project site, as shown in Figure 1, is bounded by 1<sup>st</sup> Street to the west, N Place to the north, the Anacostia River to the south, and the DC Water Main Pumping Station to the east. The site is served by one north-south principal arterial, South Capitol Street, as well as the east-west minor arterial, M Street. The site is within close proximity to Interstates 395 and 295. In addition, the site location is well connected to the city's grid of minor arterial, collector, and local roadways.

The site is served by several public transportation sources, including Metrorail and Metrobus. The project site also features a pedestrian network consisting of sidewalks and crosswalks along the local streets surrounding the project site. In addition to pedestrian accommodations, the site is also served by the on- and off-street bicycle network.

## 1.2 Roadways

As stated previously, one major arterial serves the proposed development site: South Capitol Street. The DC street grid provides thorough connectivity between the site and surrounding regions with minor arterials and collector roadways like M Street and 4<sup>th</sup> Street SE, enhancing the ease of travel across the local roadway network to the major arterials. Figure 2 and Figure 3 show the roadway network hierarchy and the average annual daily traffic (AADT) volumes for the roadways near the proposed development, respectively.

The immediate study area of the DC Water PUD has several key local access roads. These include:

- South Capitol Street  
South Capitol Street is a six- to eight-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a principal arterial with an average daily traffic of 47,600 vehicles in the vicinity of the proposed development. Within the limits of the study area, South Capitol Street runs from the Frederick Douglas Memorial Bridge and Potomac Avenue to I Street and the I-395 freeway ramps. North of M Street, South Capitol Street functions as a grade-separated roadway, and on-street parking is prohibited. South of M Street, South Capitol Street has been reconfigured from a grade-separated facility to a boulevard. On-street parking is prohibited south of M Street as well.
- M Street SE  
M Street is a six-lane east-west minor arterial that connects Maine Avenue SW to 11<sup>th</sup> Street SE. It has an average daily traffic volume of 19,200 vehicles in the vicinity of the proposed development. M Street has a six-lane cross-section with a median, which is converted into center turn lanes at several intersections. Limited parking is available along both sides of the street, but parking is generally prohibited at these locations during peak hours.
- Potomac Avenue SE  
Potomac Avenue is a four-lane roadway that runs east-west in the vicinity of the site. DDOT classifies it as a collector roadway with an average daily traffic of 5,800 vehicles in the vicinity of the proposed development. Within the limits of the study area, Potomac Avenue connects 1<sup>st</sup> Street SW to 1<sup>st</sup> Street SE. On-street parking is permitted on Potomac Avenue at all times on a portion of the roadway. Bike lanes also provided on both sides of the roadway.

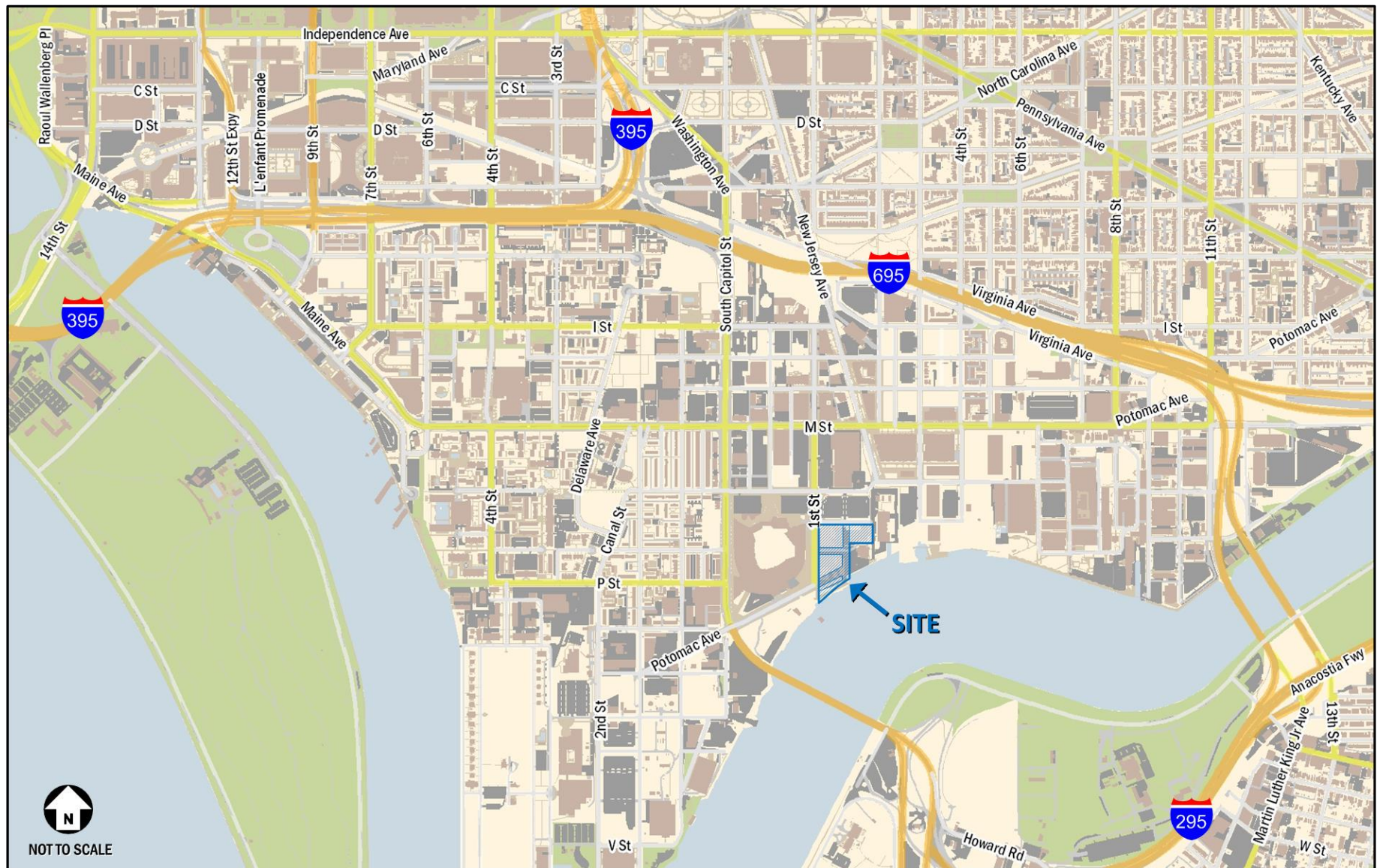


Figure 1: Site Location

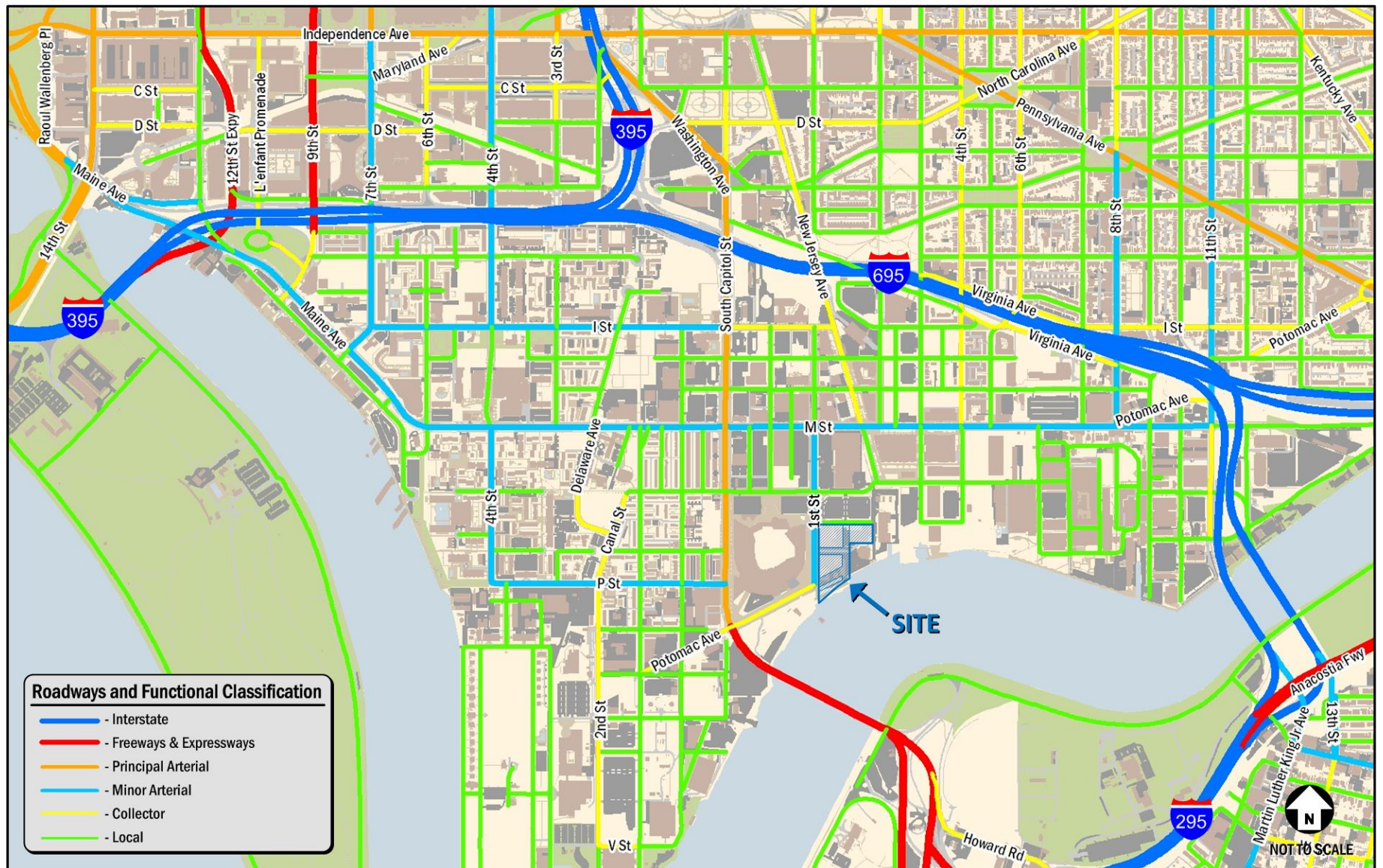


Figure 2: Roadways Network and Functional Classification

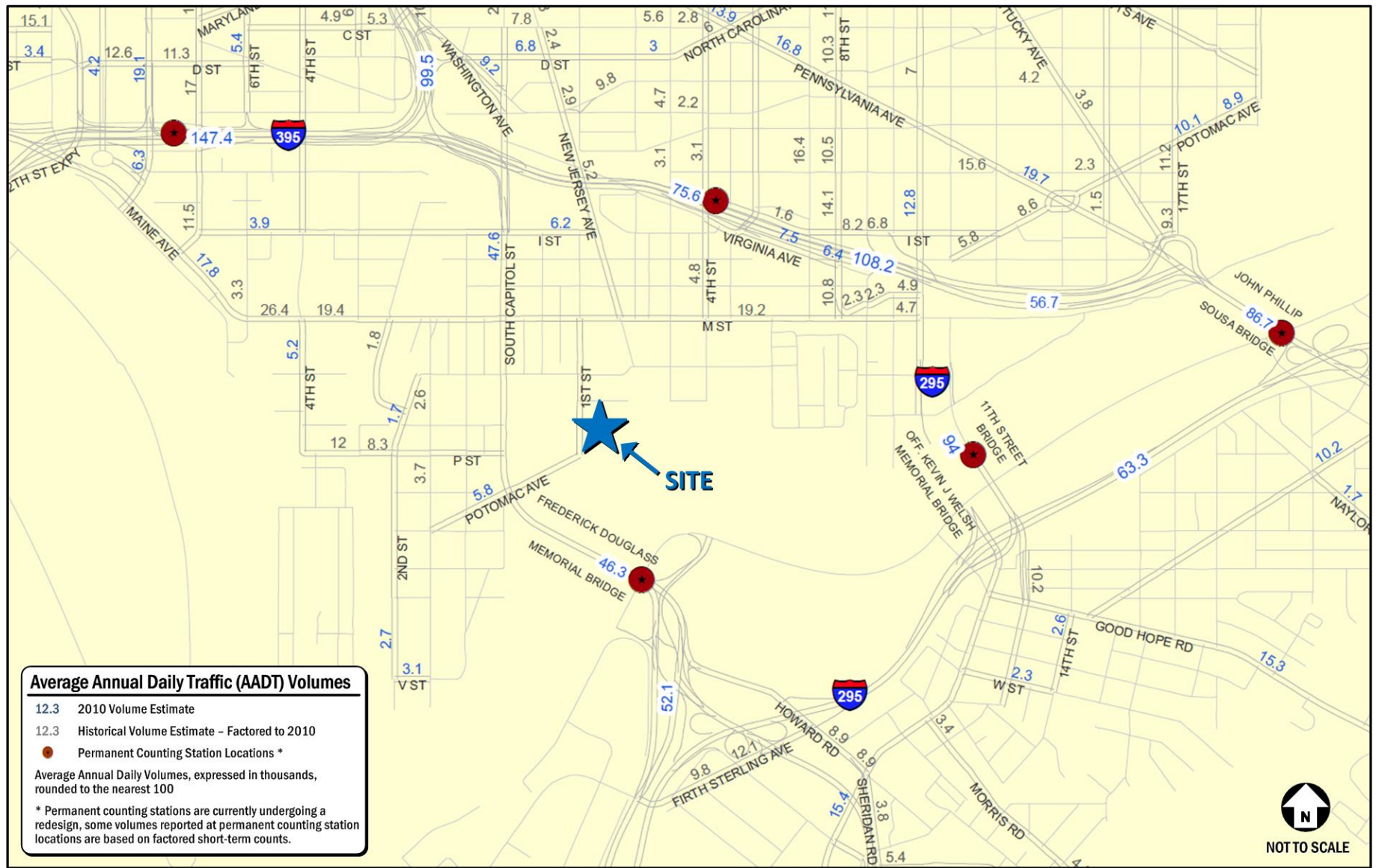


Figure 3: Average Annual Traffic Volumes

- *I (Eye) Street SE*

DDOT classifies I (Eye) Street as a minor arterial with average daily traffic volumes of 6,200 vehicles per day. I (Eye) Street has a four-lane cross-section and operates east-west between 7<sup>th</sup> Street SW to New Jersey Avenue SE. Restricted residential parking and limited public parking line both sides of the roadway.
- *N Street/Tingey Street*

N Street is a two-lane roadway that runs east-west in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, N Street runs from South Capitol Street to the Washington Navy Yard. West of New Jersey Avenue, the roadway is named “N Street.” Within the limits of The Yards, east of New Jersey Avenue, the roadway is named “Tingey Street”. On-street parking is permitted on N Street during off-peak periods.
- *1<sup>st</sup> Street SE*

First Street is a four-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, 1<sup>st</sup> Street intersects M Street north of the proposed development and connects to Potomac Avenue east of the site. On-street parking is permitted on 1<sup>st</sup> Street at all times on the eastern side of the roadway. Bike lanes also provided on both sides of the roadway.
- *New Jersey Avenue SE*

New Jersey Avenue is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway with an average daily traffic of 3,000 vehicles in the vicinity of the proposed development. Within the limits of the study area, New Jersey Avenue intersects M Street northeast of the proposed development. South of M Street, on-street parking is permitted on New Jersey Avenue at all times on the eastern side of the roadway; on-street parking is also permitted at all times on both sides of New Jersey Avenue north of M Street.
- *3<sup>rd</sup> Street SE*

Third Street is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, 3<sup>rd</sup> Street intersects M Street northeast of the proposed development. The portion of 3<sup>rd</sup> Street between Tingey Street and M Street is closed to through-traffic due to security at the USDOT headquarters. Vehicles may not travel southbound on 3<sup>rd</sup> Street at M Street. At Tingey Street, vehicles accessing the USDOT may enter through security gates to on-site parking facilities. South of Tingey Street, 3<sup>rd</sup> Street continues through Washington Navy Yard. North of M Street, on-street parking is permitted on 3<sup>rd</sup> Street at all times on both sides of the roadway; on-street parking is also prohibited at all times on both sides of 3<sup>rd</sup> Street south of Tingey Street.
- *4<sup>th</sup> Street SE*

Fourth Street is a two- to four-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a collector roadway with an average daily traffic of 4,800 vehicles in the vicinity of the proposed development. Within the limits of the study area, 4<sup>th</sup> Street intersects M Street northeast of the proposed development. North of M Street, 4<sup>th</sup> Street is a two-lane one-way southbound roadway. On-street parking is provided on the western side of 4<sup>th</sup> Street at all times; on the eastern side of 4<sup>th</sup> Street, on-street parking is provided at all times except the afternoon peak period, reducing the roadway to a one-lane cross-section. South of M Street, 4<sup>th</sup> Street is a four-lane two-way roadway. On-street parking is provided at all times except morning peak period on the western side



and afternoon peak period on the eastern side of the roadway, reducing the roadway to a 3-lane cross-section during peak periods and a two-lane cross-section during off-peak periods.

- 5<sup>th</sup> Street SE  
Fifth Street is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a local roadway in the vicinity of the proposed development. Within the limits of the study area, 5<sup>th</sup> Street intersects M Street at the northeast corner of the proposed development. On-street parking is permitted on 5<sup>th</sup> Street at all times on both sides of the roadway.
- 8<sup>th</sup> Street SE  
Eighth Street is a two-lane roadway that runs north-south in the vicinity of the site. DDOT classifies it as a minor arterial with an average daily traffic of 10,800 vehicles in the vicinity of the proposed development. Within the limits of the study area, 8<sup>th</sup> Street intersects M Street east of the proposed development. The portion of 8<sup>th</sup> Street south of M Street is closed to through-traffic due to security at the Washington Navy Yard. Vehicles may not travel southbound on 8<sup>th</sup> Street at M Street. South of M Street, 8<sup>th</sup> Street operates within Washington Navy Yard. North of M Street, on-street parking is permitted on 8<sup>th</sup> Street at all times on the western side of the roadway; on the eastern side of the roadway, on-street back-in angled parking is provided at all times.

Two major infrastructure projects are located near the proposed development: the 11<sup>th</sup> Street Bridges Improvement Project and the South Capitol Street Improvement Project. The majority of the future roadway changes outlined by these projects will not affect the roadway network immediately surrounding the project site. However, both projects will improve access to the proposed development by reducing congestion on the roadway network and providing additional mobility in the study area. These projects are outlined in greater detail in Section 1.7.1.

The study area for the M Street SE/SW Transportation Study also encompasses the proposed One M Street development. The study includes potential improvements for the near-, mid-, and long-term in order to address the current and future transportation challenges along M Street SE/SW and in the surrounding area. The study is outlined in greater detail in Section 1.7.1.

### 1.3 Car-Sharing

Three car sharing companies serve the District: Zipcar, Hertz on Demand, and Daimler’s Car2Go. All three services are private companies that provide registered users access to a variety of automobiles. Zipcar has a few locations adjacent to the project site, but Hertz on Demand does not. Table 1 lists the car-sharing locations provided by Zipcar in the study area and the number of vehicles available.

**Table 1: Carshare Location and Vehicles (Zipcar)**

Carshare Location	Number of Vehicles
3 <sup>rd</sup> & N Streets SE (Lot L at The Yards)	4 vehicles
1100 South Capitol Street SE	3 vehicles
1101 South Capitol Street SW	3 vehicles
<b>Total Number of Carshare Vehicles in Study Area</b>	<b>10 vehicles</b>

Car-sharing is also provided by Car2Go in DC. Car2Go provides point-to-point car sharing. Unlike Zipcar, which requires a two-way trip, Car2Go can be used for one-way rentals. Car2Go currently has a small fleet of vehicles located throughout the District. Car2Go vehicles may park in any non-restricted metered curbside parking space or Residential Parking Permit

location in any zone throughout the defined “Home Area.” Members do not have to pay the meters or pay stations. Vehicle availability is tracked through their website. While no Car2Go car-sharing vehicles are permanently located within the study area, they provide an additional option for car-sharing patrons.

#### 1.4 Transit

The study area is served by heavy rail, commuter bus, DC Circulator bus, and local bus service. Combined, these transit services provide local, city wide, and regional transit connections and link the site with major cultural, residential, employment, and commercial destinations throughout the region. Figure 4 identifies the major transit routes, stations, and stops in the study area.

The Metrobus and Metrorail systems provide public transportation access to the DC Water PUD site. The nearest Metrorail station is Navy Yard, located approximately one quarter of a mile from the northeast corner of the proposed development at the intersection of New Jersey Avenue and M Street. An additional portal is provided at the intersection of Half Street and M Street, approximately three tenths of a mile away from the northwest corner of the site. The green line serves the Navy Yard station running approximately every 6 minutes during the morning and afternoon peak periods and every 15 to 20 minutes during the weekday off-peak periods and on weekends.

Metrobus service is accessible to the site, with stops adjacent to the site on M Street and near the site on other surrounding roadways. The majority of the Metrobus lines that serve the site converge at the Navy Yard Metrorail station. These routes connect the site with several destinations throughout downtown DC and the surrounding areas. The DC Circulator bus is also accessible to the site, with stops provided near the intersection of 4<sup>th</sup> Street and M Street. Table 2 shows a summary of the bus route information for the lines that serve the site, including service hours, headways, and average weekday ridership.

**Table 2: Bus Route Information**

Route Number	Route Name	Service Hours <sup>1</sup>	Peak Hour Headway <sup>1</sup>	Average Weekday Ridership <sup>2</sup>
A42, 46, 48	Anacostia-Congress Heights Line	Late night extension of A2, 6, 8 line Weekdays: 12:00 am – 6:00 am Weekends: 12:00 am – 8:00 am	N/A (Late-night service only)	11,440 (includes A2, A6, A7, A8, A42, A46, and A48)
A9	Martin Luther King Jr. Ave Limited Line	Weekday peak hours only: 6:00 am – 9:00 am, 4:00 pm – 7:00 pm	15 min	543
P6	Anacostia-Eckington Line	Weekdays & Saturdays: 5:00 am – 2:00 am Sundays: 7:00 am – 12:00 am	15-20 min	2,672 (includes P1, P2, and P6)
V7, 8, 9	Minnesota Ave-M Street Line	4:30 am – 1:30 am	30 min	4,130
74	Convention Center-Southwest Waterfront Line	5:00 am – 1:00 am	15-20 min	1,393
90, 92 93	U Street-Garfield Line	24 Hours	7-8 min	12,320 (includes 90, 92, and 93)

<sup>1</sup> WMATA route schedules, <http://wmata.com/bus/timetables/>

<sup>2</sup> For WMATA routes, WMATA FY 2012 Weekday Average Ridership, [http://wmata.com/pdfs/planning/FY12\\_Bus\\_Ridership\\_By\\_Line.pdf](http://wmata.com/pdfs/planning/FY12_Bus_Ridership_By_Line.pdf)  
For DC Circulator, DC Circulator Dashboard, Average Ridership by Day of Week, 1/1/2011 to 12/31/2011, <http://circulatordashboard.dc.gov/>

Route Number	Route Name	Service Hours <sup>1</sup>	Peak Hour Headway <sup>1</sup>	Average Weekday Ridership <sup>2</sup>
DC Circulator	Union Station-Navy Yard	Winter Hours (October 1 – March 31) Weekdays: 6:00 am – 7:00 pm Summer Hours (April 1 – September 30) Weekdays: 6:00 am – 9:00 pm Saturdays: 7:00 am – 9:00 pm Extended service on Nationals game days	10 min	1,719

There are several methodologies for calculating bus Level of Service (LOS). One such method is based on peak period service frequencies, or how many times per hour a user can catch a bus. Higher frequencies contribute to more convenient service and lower overall travel time for riders because wait time is reduced. Under this method, which is described in Transit Cooperative Research Program (TCRP) *Transit Capacity and Quality of Service Manual, 2<sup>nd</sup> Edition, 2003*, LOS A is defined by an average headway of less than 10 minutes (more than 6 buses per hour), which is a service level that is frequent enough that passengers generally do not need to consult route schedules. LOS F is defined by an average headway of more than 60 minutes (less than one bus per hour). Peak hour LOS for each route within the study area is presented in Table 3.

**Table 3: Bus Route Level of Service**

Route Number	Route Name	Peak Hour Headway <sup>3</sup>	Transit LOS <sup>4</sup>
A42, 46, 48	Anacostia-Congress Heights Line	n/a (late-night service only)	n/a
A9	Martin Luther King Jr. Ave Limited Line	15 min	C
P6	Anacostia-Eckington Line	15-20 min	C
V7, 8	Minnesota Ave-M Street Line	30 min	D
74	Convention Center-Southwest Waterfront Line	15-20 min	C
90, 92	U Street-Garfield Line	7-8 min	A
DC Circulator	Union Station-Navy Yard	10 min	B

Due to growth of population, jobs, and retail in several neighborhoods in the District and the potential for growth in other neighborhoods, the District’s infrastructure is challenged with the need for transportation investments to support the recent growth and to further strengthen neighborhoods. In order to meet these challenges and capitalize on future opportunities, DDOT has developed a plan to identify transit challenges and opportunities and to recommend investments. This is outlined in the *DC’s Transit Future System Plan* report published by DDOT in April 2010. This plan includes the reestablishment of streetcar service in the District and in the vicinity of the proposed development.

<sup>3</sup> WMATA route schedules, <http://wmata.com/bus/timetables/>

<sup>4</sup> Transit Cooperative Research Program (TCRP) *Transit Capacity and Quality of Service Manual, 2<sup>nd</sup> Edition, 2003*. Exhibit 3-12.

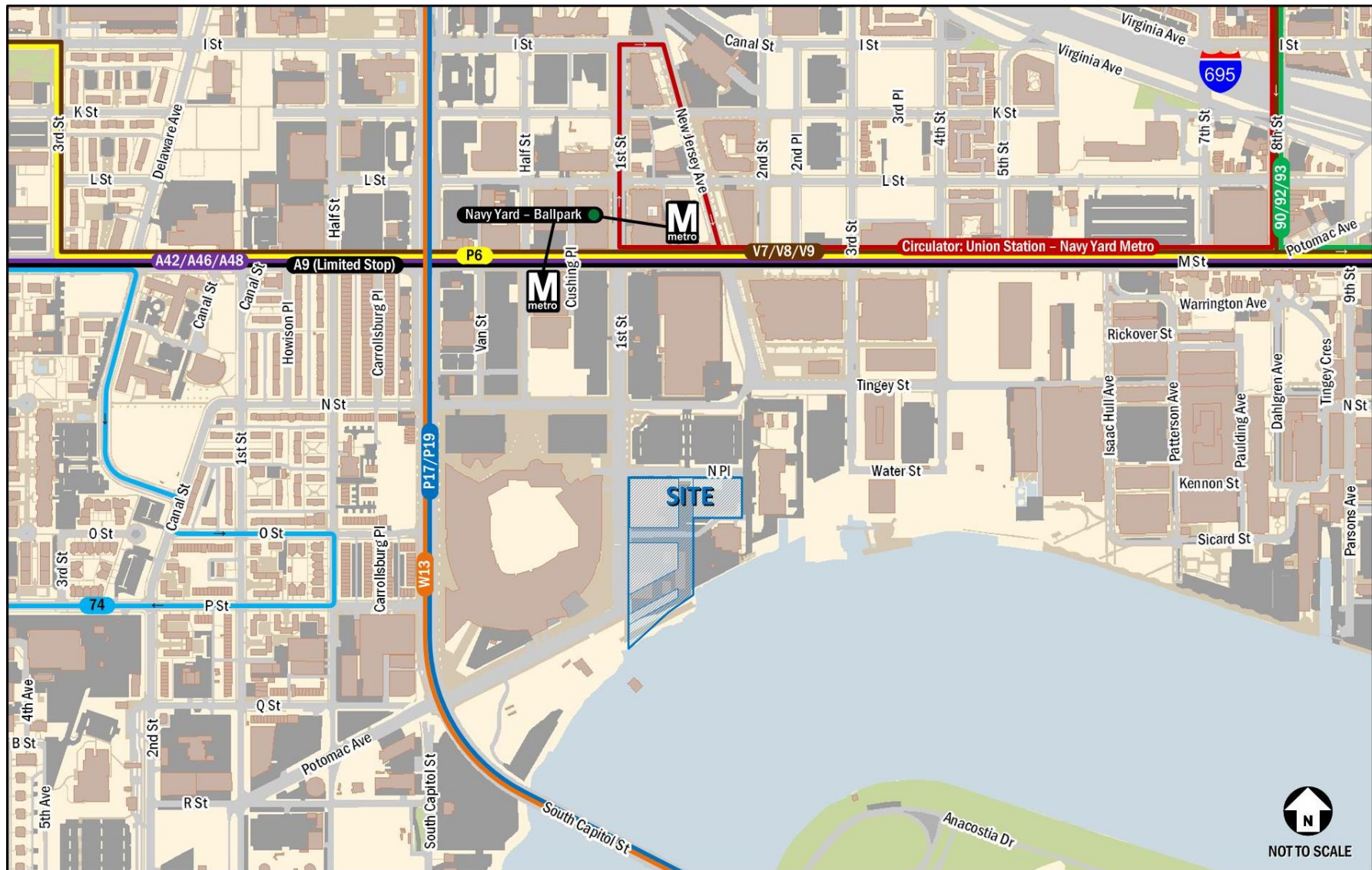


Figure 4: Existing Transit Facilities

The streetcar system element of the plan includes three routes that travel near the project site. The streetcar system will consist of modern low-floor vehicles that operate on surface tracks embedded in the roadways, which will mostly operate in travel lanes that are shared with automobiles. Stops will generally be located every ¼- to ½-mile along the routes. The future planned routes serving the study area will connect the site to several areas in the District including Buzzard Point, Congress Heights, Woodley Park, Adams Morgan, and Washington Circle.

The Metro Express limited-stop bus service element of the plan includes one route that travel near the project site. The network of new limited-stop bus service (“Metro Express”) will consist of high-frequency bus services using specially marked vehicles, operated by WMATA, which will supplement the four existing Metro Express routes that operate along Georgia Avenue, 16<sup>th</sup> Street, Wisconsin Avenue, and Pennsylvania Avenue. Stops will generally be located every ¼- to ½-mile along the routes. The Metro Express bus services will also include traffic signal priority and real-time Next Bus arrival displays. The future planned corridor near the site travels along the 11<sup>th</sup> Street Bridges, M Street, and 8<sup>th</sup> Street.

### **1.5 Bicycle Facilities**

Within the study area, bicyclists have access to multi-use trails, on-street bike lanes, signed bike routes, and local and residential streets that facilitate cycling. The site is directly served by multi-use trails, signed bicycle routes, and local streets that accommodate cycling. The bicycle network generally provides good conditions for local trips and there are several routes for trips between the study area and Northern Virginia, Northwest Washington DC, and destinations south of the Anacostia River.

For cyclists, the most attractive routes are those that have good cycling conditions and provide direct routing between origins and destinations. Conditions in the study area that contribute to good cycling conditions includes minimal changes in topography, multi-use trails that separate bicycle traffic from vehicle traffic, on-street bicycle lanes that designate bicycle rights-of-way, multiple Capital Bikeshare stations, local and collector streets with low traffic volumes and speeds, sidewalks that permit bicycle traffic and provide routing through barriers, and bicycle parking.

Within the existing study area, cycling conditions are good and provide attractive conditions for commuters and recreational riders alike. The existing conditions provide a good environment for cycling including low traffic volumes and speeds, wide travel lanes, the Anacostia Riverwalk Trail, three Capital Bikeshare stations, and ample bicycle parking. Bike lanes are provided along 1<sup>st</sup> Street, adjacent to the site. A direct connection to the Anacostia Riverwalk Trail is provided along Potomac Avenue at South Capitol Street to cross the Frederick Douglass Bridge across the Anacostia River. A second connection to the Trail is provided along Potomac Avenue at Diamond Teague Park to travel along the Anacostia River and through The Yards Park. On weekdays, the Trail is open south of the Navy Yard to provide connection to the Trail further east and across the 11<sup>th</sup> Street Bridge. A portion of the Trail to connect to Diamond Teague Park and travel along the Anacostia River and 2<sup>nd</sup> Street SW is proposed. In addition to bike lanes and the off-street trail, on-street signed bicycle routes are provided along 4<sup>th</sup> Street to the east and along I (Eye) and K Streets to the north of the site.

This portion of the District has several major roads with high traffic volumes and speeds, man-made and natural barriers, and a lack of existing bicycle facilities. Generally, poor cycling conditions in the study area result when bicycle routes use or cross streets with high traffic volumes and speeds, barriers that increase the distance between origins and destinations or block access, intersection geometries that create conflicting bicycle, vehicle and pedestrian desire lines, freeway access ramps, and gaps in the bicycle network. These conditions reduce the attractiveness of cycling in the study area and may discourage people from using bicycles. There are some routes with barriers to cycling along them and entire roadway corridors that have poor cycling conditions that reduce the overall quality of cycling conditions and limit the number of

routes that directly link the site with destinations throughout the District and region. Figure 5 illustrates bicycle facilities in the study area. In the study area, the greatest barrier to cycling is South Capitol Street, which is difficult to cross due to high vehicular speeds and traffic volumes, as well as limited roadway connections.

Some bicycle parking was observed in the study area though most cyclists typically use street signs, parking meters, or similar objects to secure their bicycles. This indicates that there is demand for additional bicycle parking facilities in the study area.

As shown in the *DC Bicycle Master Plan* from April 2005, DDOT’s proposed bicycle infrastructure for the roadways in the vicinity of the proposed development includes several multi-use trails, on-street bike lanes, and signed bicycle routes. The facilities will significantly improve bicycling conditions in the study area and may lead to higher rates of cycling. They also link the site with major residential and commercial destination in near Southeast, DC and beyond. The proposed extension of the bike lanes along 4<sup>th</sup> and 5<sup>th</sup> Street, as well as other planned facilities.

The newly formed Capital Bikeshare was launched in late September 2010 to replace the DC SmartBike program. This program has placed over 175 bicycle-share stations across Washington, DC and Arlington, VA with approximately 1,675 bicycles provided. In the vicinity of the proposed development, Capital Bikeshare stations have been placed along 1<sup>st</sup> Street at N Street, along M Street at New Jersey Avenue, and along 1<sup>st</sup> Street at K Street<sup>5</sup>, as shown in Table 4. In conjunction with the improvements proposed in the *Bicycle Master Plan*, the Capital Bikeshare program will increase accessibility of bicycles to the proposed development. Bikeshare makes bicycling an attractive and convenient option. Capital Bikeshare has plans to expand the system and potential new station locations and expanded locations have been identified. There is not an official timeline for when potential stations will be installed. The DDOT map of “Capital Bikeshare Proposed and Expanded Locations” shows a proposed additional location along N Street near 3<sup>rd</sup> Street.

**Table 4: Bikeshare Location and Docking Stations**

Bikeshare Location	Number of Docking Stations
1 <sup>st</sup> Street & N Street SE	23 docking stations
M Street & New Jersey Avenue SE	17 docking stations
1 <sup>st</sup> street & K Street SE	15 docking stations
<b>Total Number of Bikeshare Docking Stations Study Area</b>	<b>55 docking stations</b>

## 1.6 Pedestrian Facilities

Overall, the pedestrian facilities within the study area provide a good walking environment. Pedestrian access to the site is provided along 1<sup>st</sup> Street SE and N Place SE. Sidewalks, crosswalks, and curb ramps with detectable warnings are provided at most intersections in the study area. Pedestrian activity within the study area occurs along transit access routes, in the vicinity of transit stops, at commercial nodes along M Street, and, to a lesser extent, between residential neighborhoods and transit and commercial nodes. Nearly all streets in the study area have adequate sidewalks, planted buffers between sidewalks and the curb, and on-street parking that provides an additional buffer between pedestrians and vehicular traffic.

The bus stops located along M Street serve bus routes that provide local and commuter service between the study area and destinations downtown and in the surrounding area. Pedestrians access these bus stops along the local pedestrian network at the site and within the residential and commercial neighborhoods located adjacent to the site. There is some pedestrian activity between transit stops and residential areas throughout the day.

<sup>5</sup> Capital Bikeshare: [www.capitalbikeshare.com](http://www.capitalbikeshare.com)

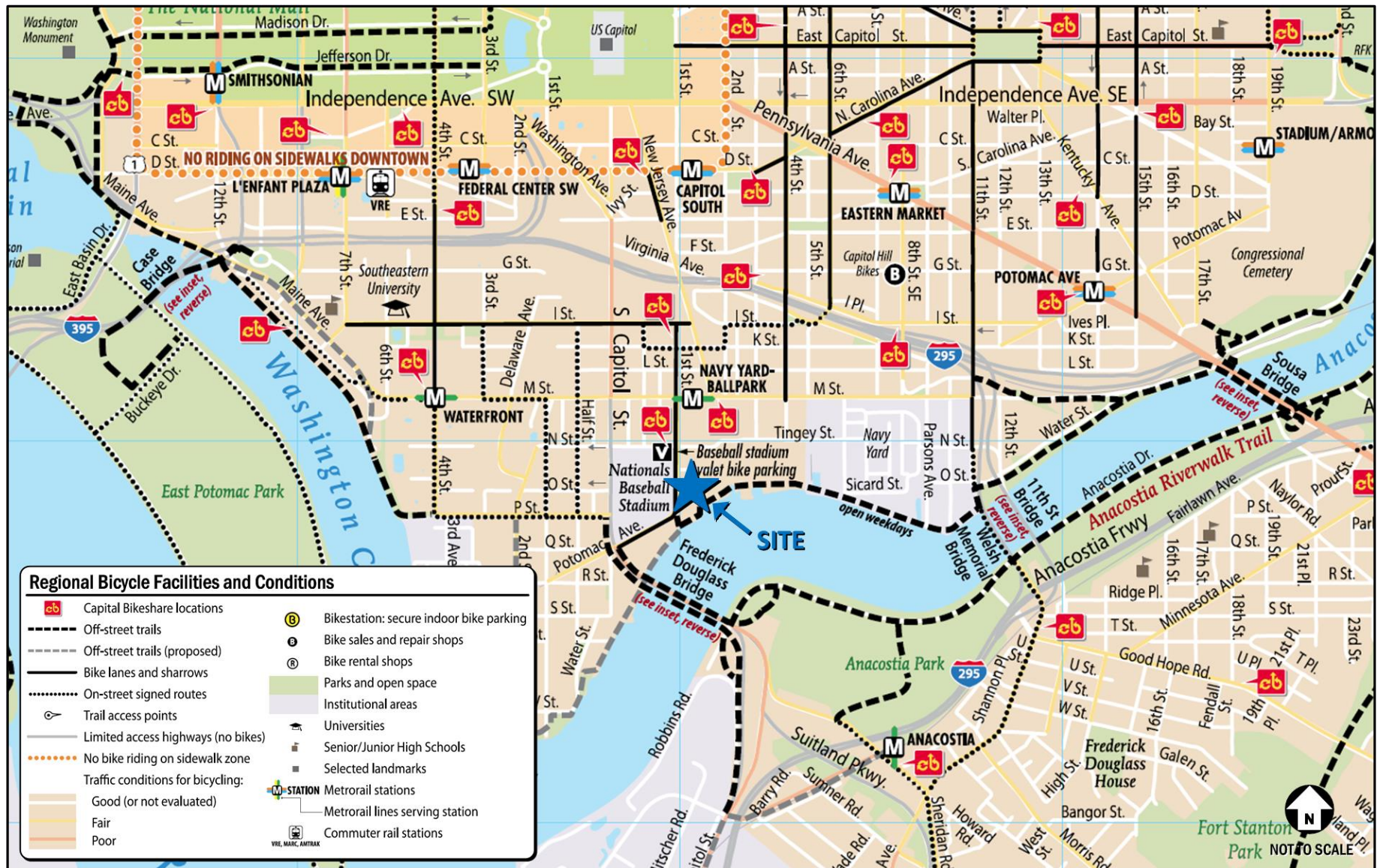


Figure 5: Existing Bicycle Facilities

There are some barriers and areas of concern within the study area that negatively impact the quality and attractiveness of walking, including walking distances between the site and some major destinations, manmade and natural barriers that increase walking distances, and roadway conditions that reduce the quality of walking conditions, including narrow sidewalks along several streets, lengthy freeway underpasses, and lengthy crossings at some intersections. Walking distances between the site and major transit and commercial destinations in the area, such as Half Street and M Street, will not have a significant impact on the pedestrian activity because access routes generally provide good walking conditions and walking is a convenient and quick option as compared to other modes.

## **1.7 Future Projects & Developments**

### **1.7.1 District Initiatives**

Both the 11<sup>th</sup> Street Bridges project and the South Capitol Street Improvement project are currently underway in the vicinity of the project site. These projects are summarized below. In addition to these projects, the M Street SE/SW Transportation Study was recently completed. This study is also summarized below.

#### **11<sup>th</sup> Street Bridges Project**

The purpose of the 11<sup>th</sup> Street Bridges project is to reduce congestion and improve mobility across the Anacostia River on the 11<sup>th</sup> Street Bridges (11<sup>th</sup> Street Bridge and Officer Welsh Bridge) and on the local streets in the vicinity of the project. Additionally, the project will increase the safety of vehicular, pedestrian, and bicycle traffic in the Anacostia area; correct design deficiencies in the existing infrastructure; and upgrade evacuation routes for security movements into and out of the nation's capital and military installations.

The Phase I Alternative Design includes complete construction of three new river crossings and two new Anacostia Freeway interchanges on the east and west sides of the Anacostia River. The improvements will no longer require traffic to use the neighborhood streets (Martin Luther King, Jr. Avenue, Good Hope Road, and Minnesota Avenue) to access the 11<sup>th</sup> Street Bridges because there will be a direct connection for trips between the Southeast/Southwest Freeway (I-395) and the Anacostia Freeway (I-295) from the north and a seamless connection to I-295 northbound at the southern end of the 11<sup>th</sup> Street Bridges complex where none exists today. In addition to the vehicular improvements, a 14-foot shared-use path will be provided on the downstream side (southwest) of the 11<sup>th</sup> Street Bridge from O Street to Good Hope Road. No sidewalk will be provided on the upstream side of the bridge due to safety concerns for pedestrians. Direct pedestrian access will be maintained between the bridges and the waterfront on both sides of the river, and bicycle facilities will be connected to the Anacostia Riverwalk Trail along both banks of the river. The DC Bicycle Master Plan will also be implemented in the study area. All pathways for pedestrians and bicycles will meet AASHTO policy and ADA standards for construction.

The 11<sup>th</sup> Street Bridges project will also improve transit connectivity in the study area by providing movements that are currently missing from the 11<sup>th</sup> Street Bridge complex to the Anacostia Freeway (I-295). The project will also remove some traffic from the local street system, particularly in the historic Anacostia area, allowing for transit to operate under more favorable traffic conditions. In addition to proposed improvements, the low-speed local bridge will be designed and constructed so as not to preclude the implementation of a possible future streetcar system on 11<sup>th</sup> Street between M Street and Martin Luther King, Jr. Avenue.



### **South Capitol Street Project**

The purpose of the South Capitol Street project is to improve safety, mobility, and accessibility and to support economic development in the vicinity of the project. The project will: (1) correct the design and deteriorating condition of the transportation infrastructure which creates safety concerns for vehicular, pedestrian, and bicycle traffic and transit riders; (2) construct missing critical regional roadway connections for vehicles, pedestrians, and bicycles; (3) correct mobility barriers that limit access to activity centers in the study area; and (4) support economic growth in order to improve the density of employment and residential development. Ultimately, the goal of the South Capitol Street projects is to address the problems of the corridor in a way that both addresses the transportation issues, while also revitalizing the surrounding neighborhoods south of the National Mall and transforming the roadway into a grand urban gateway in to the District. The future South Capitol Street corridor will correct design deficiencies, improving safety issues for all users, including drivers, transit riders, pedestrians, and bicyclists, as well as providing key connections in the local, regional, and national transportation network.

The Preferred Alternative from the Final Environmental Impact Statement includes rebuilding South Capitol Street as a six-lane boulevard with a landscaped median west of the Anacostia River. Along South Capitol Street, at-grade intersections will be reconstructed at I, N, O, P, K, L, and M Streets. The existing ramp from northbound South Capitol Street to I-395 will also be reconstructed as an at-grade interaction. A four- to five-lane traffic oval will be constructed to connect South Capitol Street, Potomac Avenue, R Street, and Q Street. The existing Frederick Douglas Memorial Bridge will be replaced and will include bicycle and pedestrian access. An additional traffic circle will be constructed to connect South Capitol Street, Suitland Parkway, and Howard Road, and several other roadway improvements are included on the eastern/southern side of the Anacostia River.

In addition to vehicular improvements, streetscape design features will be added to project area streets, including South Capitol Street, New Jersey Avenue, and Suitland Parkway. The reconstruction of South Capitol Street will also include pedestrian and bicycle facilities, which will consist of widened sidewalks, widened curbside lanes on some streets for bicycle travel, and increased pedestrian- and bicycle-oriented elements such as street trees, benches, and decorative streetlights. The proposed bicycle routes through the project area will consist primarily of signed bicycle routes that connect to local activity centers, as well as other area facilities such as the Anacostia Riverwalk Trail.

The South Capitol Street project will also improve access to transit already in the corridor by providing additional pedestrian and bicycle facilities, streetscape, and pedestrian-friendly amenities. The Preferred Alternative will also provide linkages between transit nodes and the local and regional bicycle network, and will support future transit (streetcar and bus service) throughout the corridor. The Preferred Alternative will be better equipped to accommodate the proposed future Anacostia Line of the streetcar transit system due to the proposed wide sidewalks, streetlights, signed bike routes, and multi-use trails.

### **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 12<sup>th</sup> Street SE to 14<sup>th</sup> 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 Final report recommends several potential near-term projects and policy updates. The policy updates include suggestion 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 report will be used to inform and guide the formal Project Scoping process as the project progressed from preliminary transportation planning to detailed alternatives development and preliminary design engineering.

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.

### *1.7.2 Developments*

There are several other projects proposed, approved, or under construction located in the vicinity of the proposed development. The majority of these projects are mixed-use, consisting of office, residential, and retail development, as outlined below. A map of the locations of these developments is included as Figure 6.

- *Akridge Half Street/Square 700*

The Akridge Half Street development is currently approved and awaiting construction. It consists of a mix of office, residential, and retail uses located south of M Street SE between Van Street SE and Half Street SE. The development is projected to be completed in 2014.

- *Arthur Capper/Carrollsborg and Capitol Quarter*

The Arthur Capper/Carrollsborg development is currently under construction and a significant portion of the project has been completed. It consists of a mix of residential sites located north of M Street SE and office sites

located along M Street SE between 2<sup>nd</sup> Street SE and 7<sup>th</sup> Street SE. The development is projected to be fully completed by 2022.

- *The Yards at Southeast Federal Center*

The Yards at Southeast Federal Center development is currently under construction and partially completed. It consists of a mix of office, residential, and retail sites located south of M Street SE between 1<sup>st</sup> Street SE and 5<sup>th</sup> Street SE. The remaining portions of the development are projected to be completed by 2027.

- *The Plaza on K*

The Place on K development consists of a mix of office and retail uses located north of K Street SE between Half Street SE and 1<sup>st</sup> Street SE. The first phase of the development is expected to be completed by 2015, with a second phase to be completed in 2018.

- *Florida Rock/RiverFront on the Anacostia*

The Florida Rock development consists of office, residential, retail and hotel uses located along Potomac Avenue east of South Capitol Street. The first phase of the development, which includes the residential and a portion of the retail uses, is expected to be completed in 2015. The later phases of the development, which include the office, hotel, and remainder of the retail uses, are expected to be completed by 2020.

- *Square 699/Velocity*

The Square 699N/Velocity development is a residential building located north of L Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2014. A second phase of development, which consists of office and retail uses, is planned, with an expected completion in 2019.

- *Maritime Plaza Phases III, IV, & V*

The Maritime Plaza development consists of a mix of office and hotel uses located south of M Street SE east of 12<sup>th</sup> Street SE. The development is currently under construction, with the remaining phases of the development projected to be completed by 2020.

- *Square 737*

The Square 737 development is a mix of residential and retail uses located between H Street SE and I Street SE, west of 2<sup>nd</sup> Street SE. The first phase of development is anticipated to be completed in 2014, with a final completion in 2019.

- *1111 New Jersey Avenue*

The 1111 New Jersey Avenue development consists of a mix of office and retail uses located along New Jersey Avenue north of M Street SE. The development is projected to be completed by 2015.

- *Half Street Phase II/Monument Properties*

The Half Street Phase II development is currently approved and awaiting construction, following the construction of Phase I of the development. Phase II consists of a mix of residential, retail, and hotel uses located north of N Street SE at Half Street SE, which is projected to be completed by 2014.

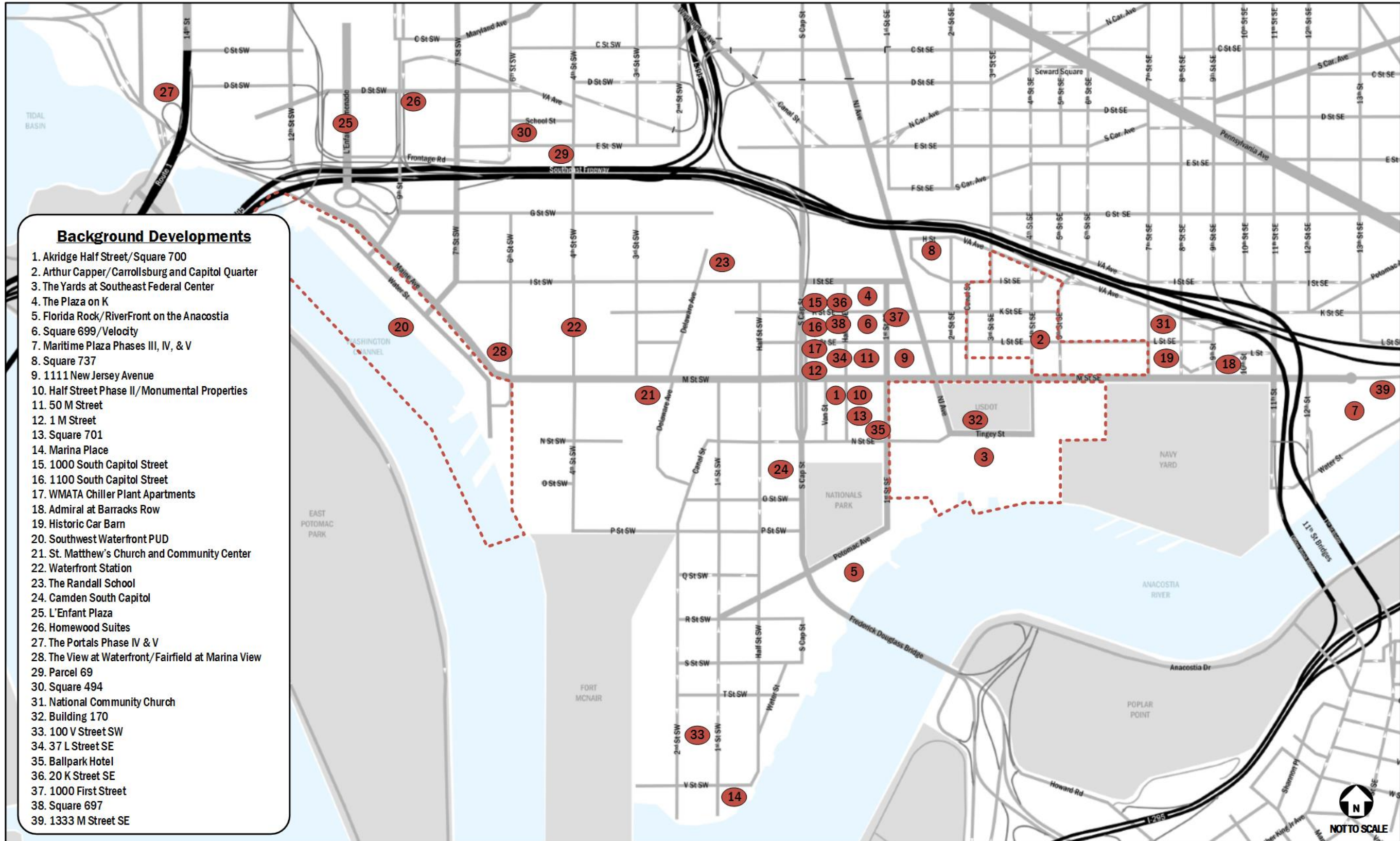


Figure 6: Background Developments

- 50 M Street  
The 50 M Street development is a mix of office and retail uses located north of M Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2018.
- 1 M Street  
The 1 M Street development is a mix of office and retail uses located south of M Street SE between South Capitol Street and Van Street SE. The development is anticipated to be completed by 2018.
- Square 701  
The Square 701 development is an office building located south of M Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2015. A second phase, which consists of a hotel, is projected to be completed in 2016.
- Marina Place  
The Marina Place development consists of a mix of residential and retail uses located west of South Capitol Street near Buzzard Point. The development is anticipated to be completed by 2019.
- 1000 South Capitol Street  
The 1000 South Capitol Street development is an office building located north of K Street SE between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2018.
- 1100 South Capitol Street  
The 1100 South Capitol Street development is an office building located north of M Street SE between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2018.
- WMATA Chiller Plant Apartments  
The WMATA Chiller Plant Apartments are a mix of residential and retail uses located north of M Street SE between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2018.
- Admiral at Barracks Row  
The Admiral at Barracks Row development consists of a mix of office and retail uses located north of M Street SE east of 9<sup>th</sup> Street SE. The development is projected to be completed by 2018.
- Historic Car Barn  
The Historic Car Barn development is a renovated retail building located north of M Street SE between 7<sup>th</sup> Street SE and 8<sup>th</sup> Street SE. The development is anticipated to be completed by 2016.
- Southwest Waterfront PUD  
The Southwest Waterfront Development is located southwest of Maine Avenue SW between the I-395 Freeway and 6<sup>th</sup> Street SW. The proposed development contains a mix of retail, residential, office, hotel, church, cultural, and marina uses. The first phase of development is anticipated to be completed by 2015, and the full development is projected to be completed by 2018.

- *St. Matthew's Church and Community Center*

The St. Matthew's Church and Community Center development is a mix of church and residential uses located south of M Street SW at the intersection with Delaware Avenue SW. The development is anticipated to be completed by 2014.
- *Waterfront Station*

The Waterfront Station development is currently under construction and partially completed, located north of M Street SW between 3<sup>rd</sup> Street SW and 5<sup>th</sup> Street SW. The remaining development consists of a residential building from Phase I, which is projected to be completed in 2013. The future phases of Waterfront Station, consisting of office and residential uses, are projected to be completed in 2020.
- *The Randall School*

The Randall School development is a renovated building consisting of a mix of residential and hotel uses located north of I Street SW at Half Street SW. The development is anticipated to be completed by 2015.
- *Camden South Capitol*

The Camden South Capitol development is a mix of residential and retail uses located west of South Capitol Street between N and O Streets SW. The development is currently under construction and anticipated to be completed in 2013.
- *L'Enfant Plaza*

The L'Enfant Plaza development consists of expanding the existing development located north of the Southwest Freeway, between 9<sup>th</sup> and 10<sup>th</sup> Streets SW. The final L'Enfant Plaza development will contain approximately 2.2 million square feet of office uses, 115,000 square feet of retail uses, and 370 hotel rooms. The expansion is anticipated to be completed by 2015.
- *Homewood Suites*

The Homewood Suites development consists of constructing a 234-room hotel on the southeast corner of 9<sup>th</sup> and D Streets SW. The development is projected to be completed in 2014.
- *The Portals Phase IV & V*

Phases IV and V of the Portals development consists of a mix of office and retail uses located at the southeast corner of 14<sup>th</sup> and D Streets SW. The development is currently under construction, with the two remaining phases of the development projected to be completed by 2020 and 2025.
- *The View at Waterfront*

The View at Waterfront (Fairfield at Marina View) development is located on the northeast corner of 6<sup>th</sup> and M Streets SW. The development, which consists of residential and retail uses, is projected to be completed in 2014.
- *Parcel 69*

The Parcel 69 development, located at 400 E Street SW, consists of office uses. The development is projected to be completed in 2013.

- Square 494  
The Square 494 development, located at 555 E Street SW, consists of a mix of office and retail uses. The development is projected to be completed in 2015.
- National Community Church  
The National Community Church development, located at 733 Virginia Avenue SE, consists of the redevelopment of the property to contain a mix of office and retail uses. The development is projected to be completed in 2018.
- Building 170  
The Building 170 redevelopment, which is located at 250 Tingey Street SE, adjacent to The Yards at Southeast Federal Center development, consists of retail uses. The building redevelopment is projected to be completed in 2016.
- 100 V Street SW  
The 100 V Street SW development, located west of 1<sup>st</sup> Street SW, between T and V Streets SW, consists of office uses. The development is projected to be completed in 2020.
- 37 L Street SE  
The 37 L Street SE development consists of office uses and is located south of L Street SE, between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2028.
- Ballpark Hotel  
The Ballpark hotel development consists of hotel located south of M Street SE between Half Street SE and 1<sup>st</sup> Street SE. The development is anticipated to be completed by 2015.
- 20 K Street SE  
The 20 K Street SE development consists of residential uses and is located north of K Street, between South Capitol Street and Half Street SE. The development is anticipated to be completed by 2016.
- 1000 First Street  
The 1000 First Street development is currently proposed, with no specified development plan. However, the development is anticipated to be completed by 2018.
- Square 697  
The Square 697 development is currently proposed, with no specified development plan. However, the development is anticipated to be completed by 2028.
- 1333 M Street SE  
The 1333 M Street SE development is currently proposed, with no specified development plan. However, the development is anticipated to be completed by 2020.

## 2: DESIGN REVIEW

This report section provides an overview of the on-site transportation features of the proposed DC Water PUD. It supplements the information provided in the site plans package that accompanied the Zoning Application, which includes several illustrations of site circulation and layout. The proposed PUD will replace the existing site uses. The site is currently occupied by the District of Columbia Water and Sewer Authority (WASA) and used to house the Department of Sewer Service and the Department of Fleet Management. There are currently three curb cut located on 1st Street, at and south of O Street, and four curb cuts located along N Place between 1st Street and the Main Pumping Station. On-street parking is provided along all of the existing public roadways that border the site. Figure 7 identifies the existing conditions surrounding the project site.

The proposed DC Water PUD consists of mixed-use development of retail, theater, and residential space. The site plan is included as Figure 8. The site occupies four parcels within Squares 744S and 744SS and is zoned W-2. In total, the development will include approximately 45,000 SF retail uses; a 16-screen, 95,000 SF movie theater; and 600 residential dwelling units. The four parcels are as follows:

- Parcel F1 – Will be developed to include a 95,000 SF, 16 screen movie theater with a total of 2,500 seats on the eastern portion of Square 744S. The parcel will contain structured parking with 337 spaces.
- Parcel G1 – Will be developed to include 20,000 SF of ground floor retail and 350 residential dwelling units on the western portion of Square 744S. The building will also include structured parking with 175 spaces.
- Parcel G2 – Will be developed to include 15,000 SF of ground floor retail and 250 residential dwelling units on the northwestern portion of Square 744SS. The building will also include structured parking with 125 spaces.
- Parcel 4 – Will be developed to include 15,000 SF of retail as well as an extension of Diamond Teague Park, adjacent to the Anacostia Riverwalk Trail.

Figure 9 shows the site access plan. Access to the site will be provided externally via N Place and 1<sup>st</sup> Street and with internal private streets constructed as O Street and 1½ Street. The site will be developed in phases with Parcel F1 being developed first, followed by the development of the remaining parcels in future phases.

### 2.1 Site Access and Internal Circulation

#### 2.1.1 Vehicular Access

The site will be accessed via a reconstructed N Place and newly constructed private, on site O Street and 1½ Street. Access will be provided at the intersections of 1<sup>st</sup> Street and N Place (existing stop-controlled intersection), 1<sup>st</sup> Street and O Street (existing stop-controlled intersection that serves the DC Water Site as a driveway), 1<sup>st</sup> Street and Potomac Avenue (existing signalized intersection with a proposed third leg), and N Place and 1½ Street (proposed stop-controlled intersection). All vehicular access to the site's parcels, with two exceptions, will be located along private streets within the proposed PUD. Curb cuts will be provided via N Place, 1½ Street (proposed on site as a private street), and O Street (proposed on site as a private street). Figure 9 shows the locations of the site access points, as well as the configuration of each intersection.

As shown in Figure 9, one curb cut is proposed along N Place east of the proposed 1½ Street, which will provide access to Parcel F1. A second curb cut is proposed along N Place between 1<sup>st</sup> Street and the proposed 1½ Street to provide access to Parcel G1. The proposed curb cuts will replace the existing curb cuts provided along the reconstructed N Place in this vicinity. Internal to the site, two curb cuts are proposed along 1½ Street, and two are proposed along O Street to provide



access to Parcels F1, G1, and G2. As noted on Figure 9, traffic signal modifications are planned at the 1<sup>st</sup> Street/Potomac Avenue intersection to accommodate an eastern leg to serve the site and the proposed 1½ Street.

No changes to the existing on-street parking are proposed, with the exception of the reconfiguration of the on-street parking along N Place as it’s reconstructed with the site. Additional on-street parking will be constructed along private streets within the PUD, as outlined in Section 2.1.3.

**2.1.2 Loading**

As described below, all loading activity will take place within the individual parcels. No back-up maneuvers from 1<sup>st</sup> Street or N Place will be necessary for trucks to access their loading docks. Access for the loading facilities will be provided via the site access points outlined above for vehicular access. Trucks will approach the site from M Street and South Capitol Street via 1<sup>st</sup> Street as shown on Figure 10. Zoning Regulations require the Applicant to provide loading facilities, as outlined in Table 5. Table 5 also shows the loading provided by the proposed PUD. Figure 11 and Figure 12 show turning diagrams for trucks accessing the proposed loading areas. These diagrams show the design vehicles accessing the loading docks without difficulties.

**Table 5: Proposed Loading**

<b>Loading</b>	<b>Zoning Requirement</b>	<b>Proposed</b>
<b>Parcel F1</b>	<i>Loading Berth</i>	1 @ 30’
	<i>Loading Platform</i>	1 @ 100 SF
	<i>Service/Delivery</i>	1 @ 20’
<b>Parcel G1 Residential</b>	<i>Loading Berth</i>	1 @ 55’
	<i>Loading Platform</i>	1 @ 200 SF
	<i>Service/Delivery</i>	1 @ 20’
<b>Parcel G1 Non-Residential</b>	<i>Loading Berth</i>	1 @ 30’
	<i>Loading Platform</i>	1 @ 100 SF
	<i>Service/Delivery</i>	--
<b>Parcel G2 Residential</b>	<i>Loading Berth</i>	1 @ 55’
	<i>Loading Platform</i>	1 @ 200 SF
	<i>Service/Delivery</i>	1 @ 20’
<b>Parcel G2 Non-Residential</b>	<i>Loading Berth</i>	1 @ 30’
	<i>Loading Platform</i>	1 @ 100 SF
	<i>Service/Delivery</i>	--
<b>Parcel G3</b>	<i>Loading Berth</i>	1 @ 30’
	<i>Loading Platform</i>	1 @ 100 SF
<b>Total Residential</b>	<i>Loading Berth</i>	2 @ 55’
	<i>Loading Platform</i>	2 @ 200 SF
	<i>Service/Delivery</i>	2 @ 20’
<b>Total Non-Residential</b>	<i>Loading Berth</i>	--
		4 @ 30’
	<i>Loading Platform</i>	--
	<i>Service/Delivery</i>	1 @ 200 SF 4 @ 100 SF 3 @ 20 SF

\* Relief requested



Figure 7: Existing Site Diagram

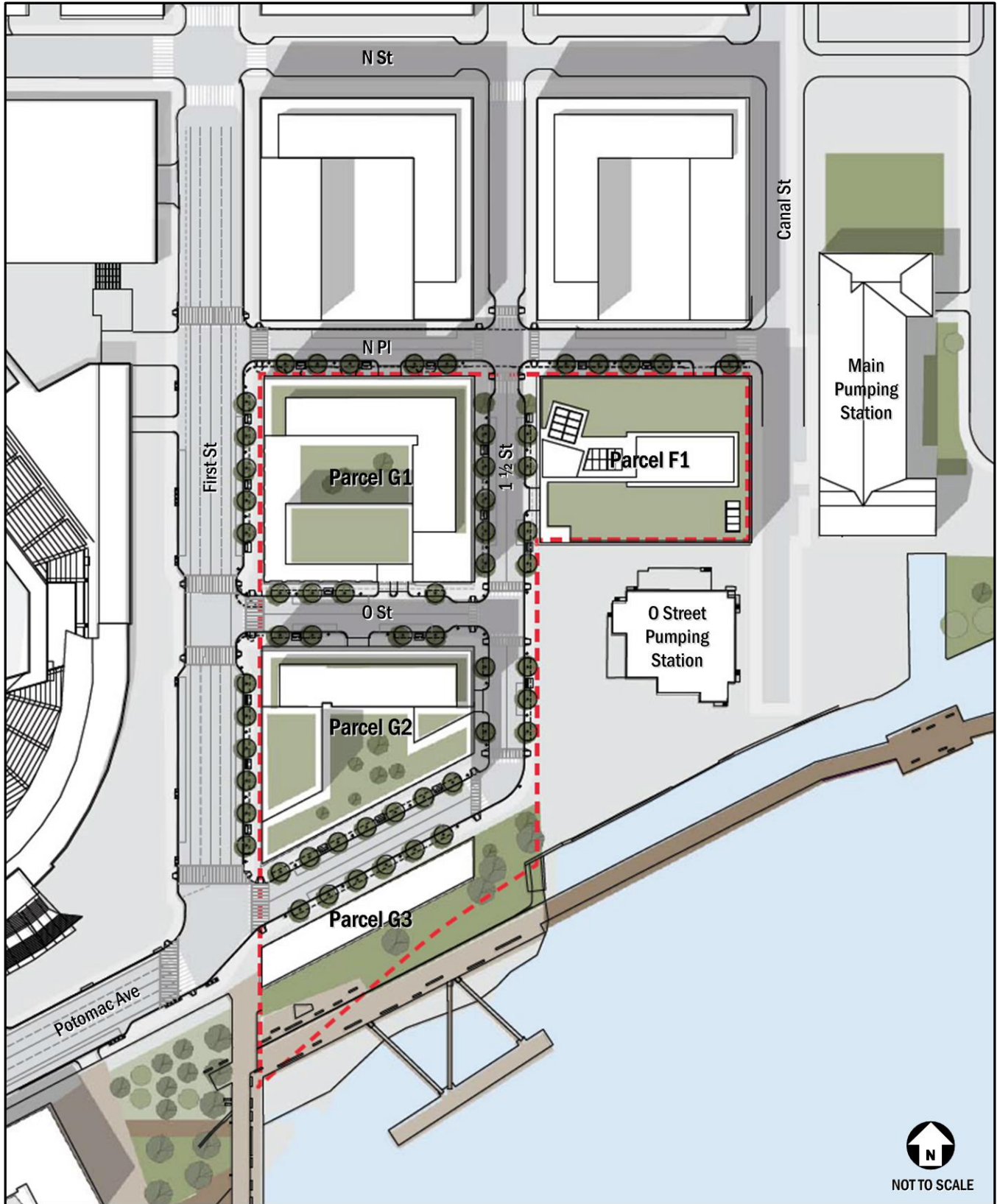


Figure 8: Proposed Site Plan

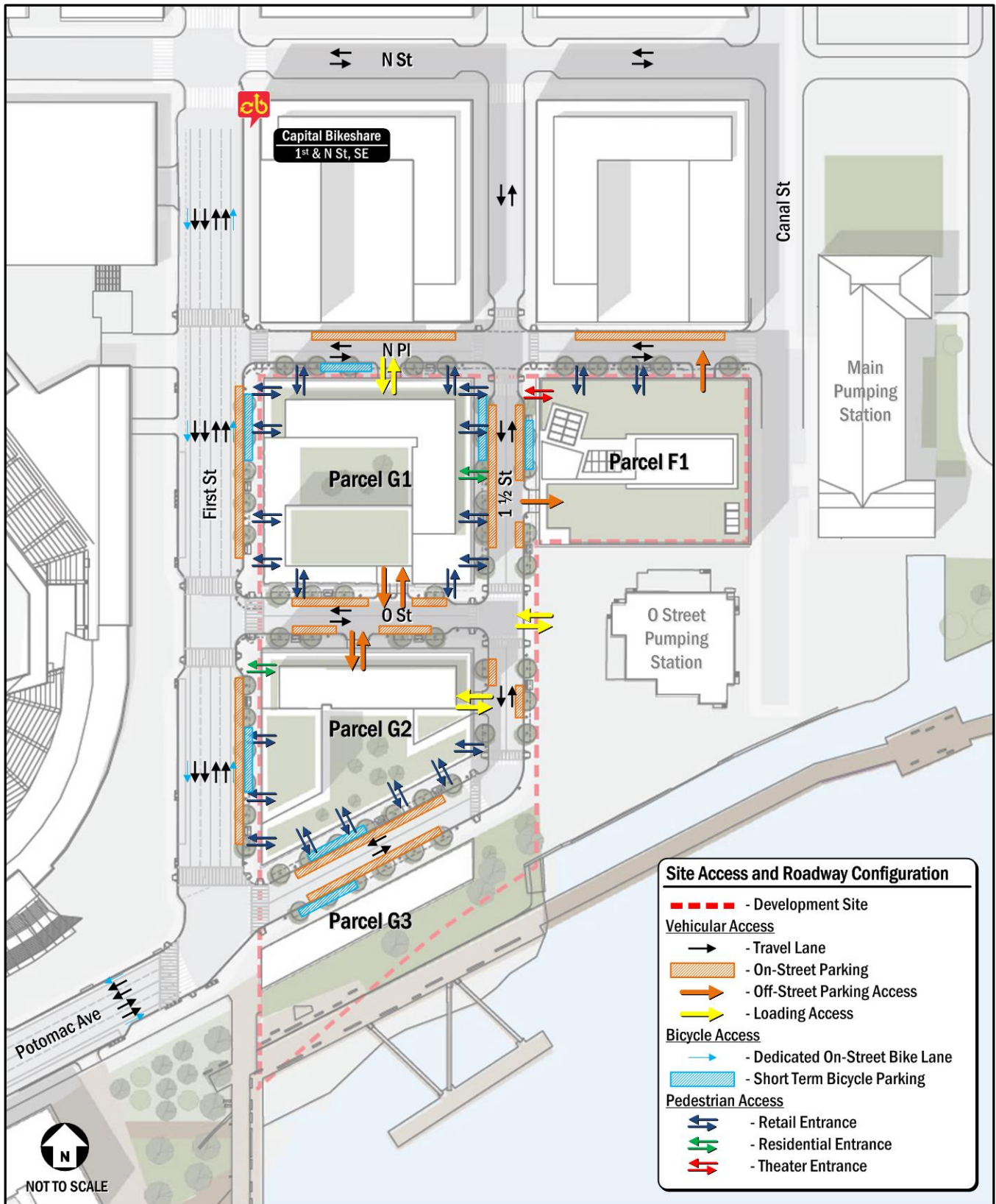


Figure 9: Proposed Vehicular Site Access

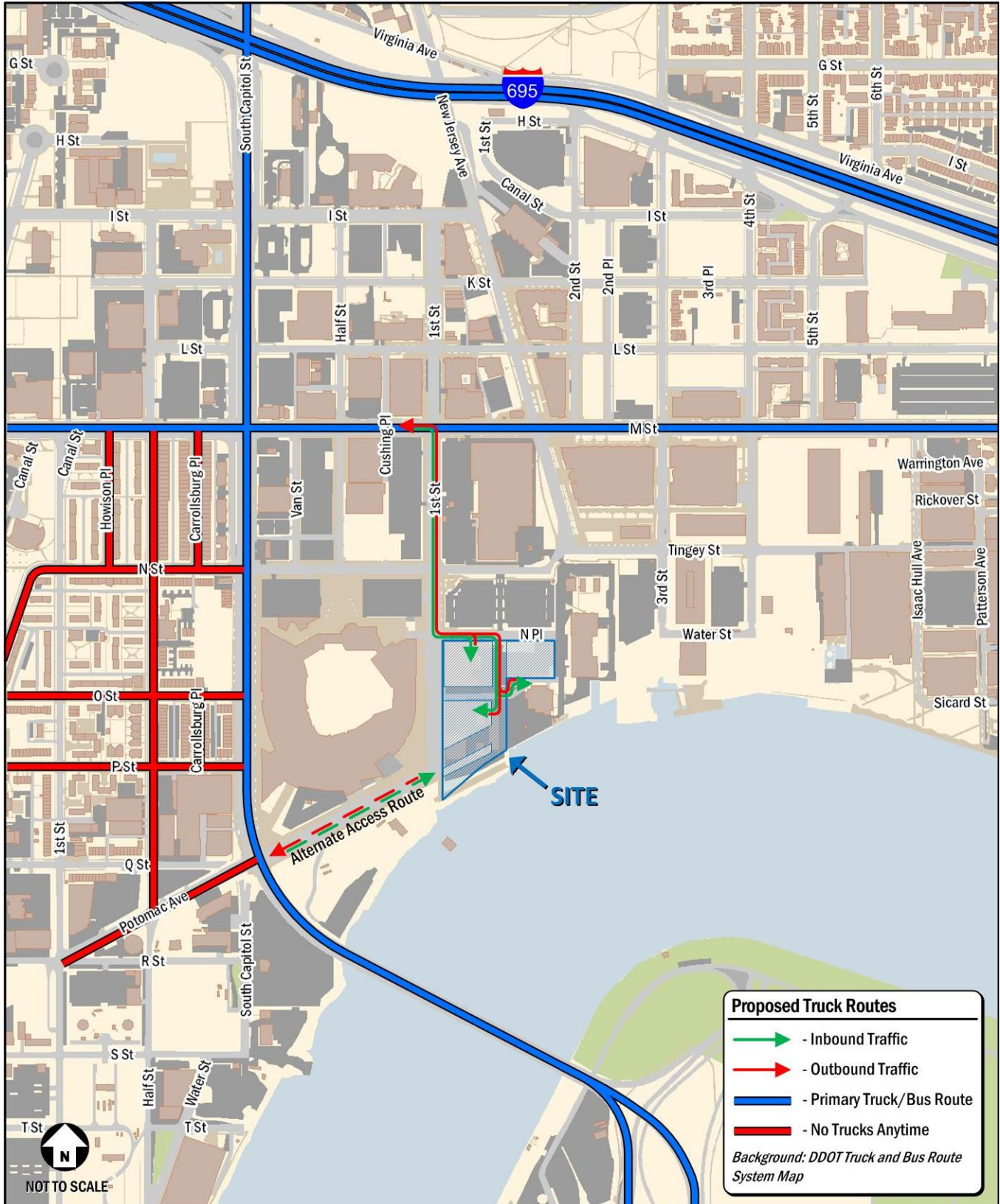


Figure 10: Truck Access Routing

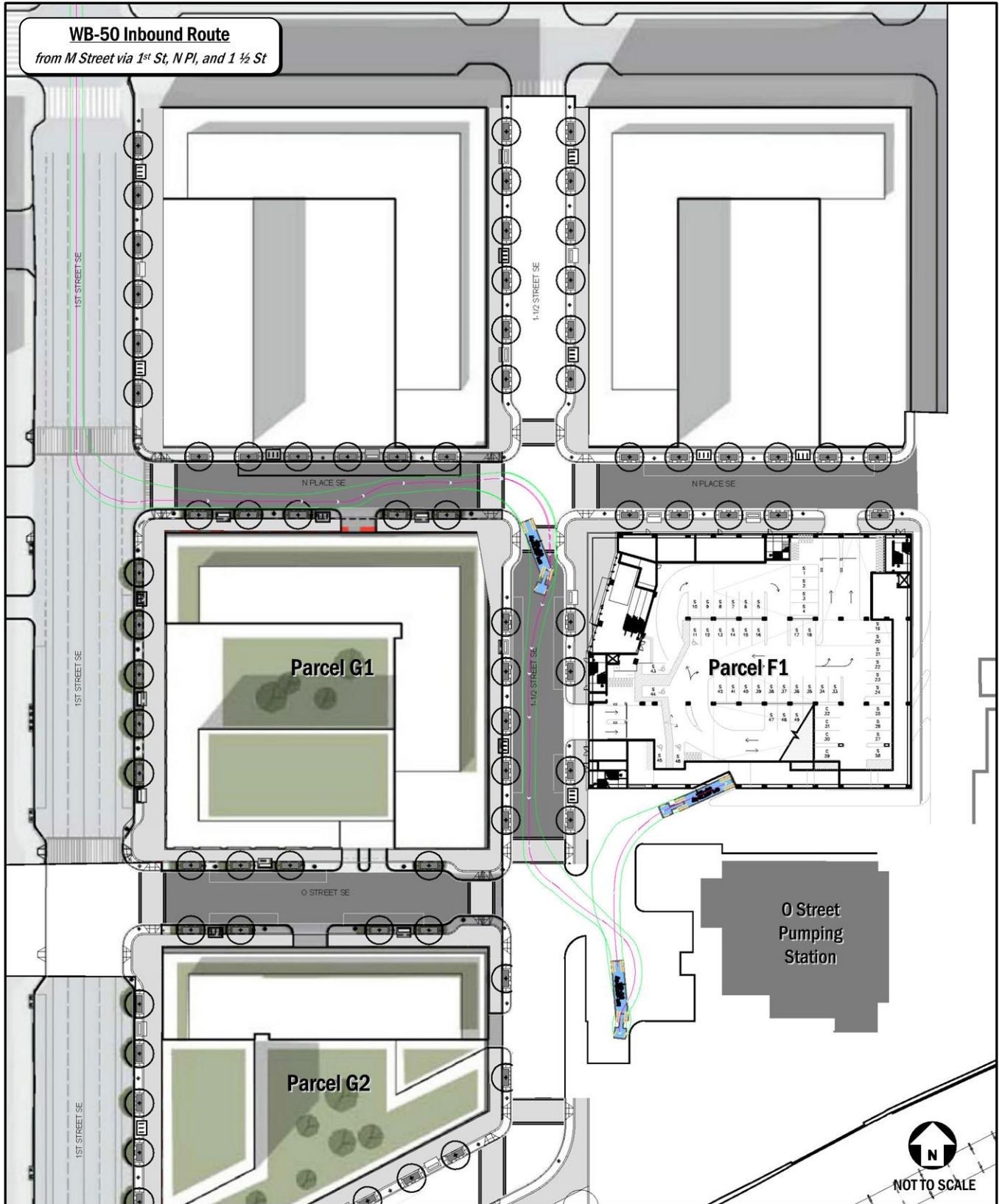


Figure 11: Inbound Truck Turning Diagram

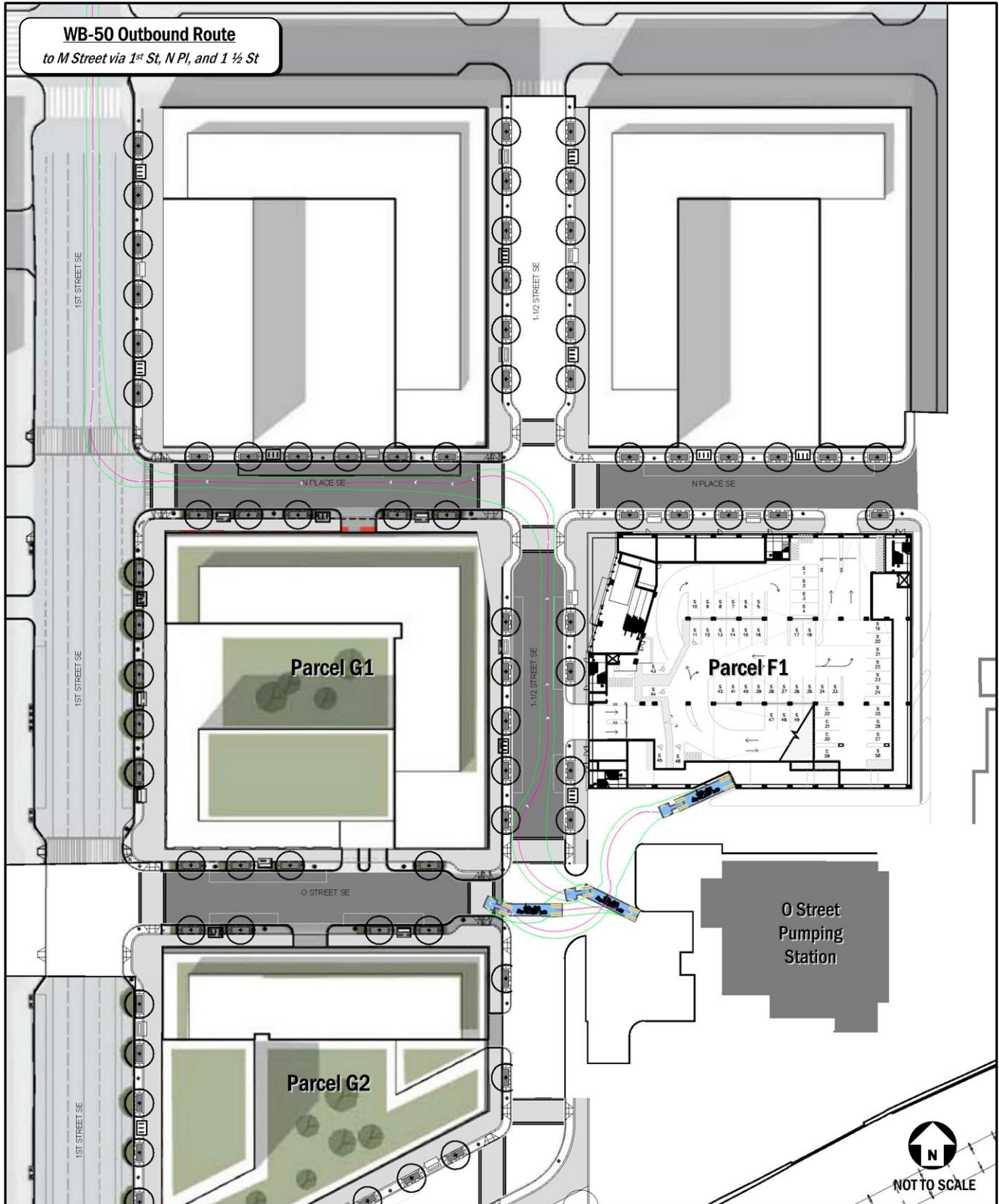


Figure 12: Outbound Truck Turning Diagram

As noted in Table 5, the Applicant is requesting relief from the Zoning requirement to provide one 30-foot loading berth and one 100 square foot loading platform for Parcel G3. Although loading facilities will not be met on this individual parcel, the loading provided for the total site exceeds that required by zoning ordinances. The loading for each individual parcel will be managed with a loading plan that will identify how the loading will be managed given the mix of uses on some of the parcels.

The expected overall loading demand for each loading dock and loading area throughout the DC Water PUD was computed in order to determine the adequacy of these proposed facilities and their ability to handle the expected demand as designed. The number of loading operations at each location was computed based the number of tenants served by each loading facility in conjunction with standard shipping frequencies for retail and restaurant uses, the expected number of deliveries for residential uses, and the projected unit turnover rate and moving truck size for the residential uses. Assumptions include the following, obtained from the files of Gorove/Slade:

- Rental apartments have an average turnover of 18 months, with two trucks expected per turnover (one move out and one move in).
- General retail stores are expected to have three (3) van-sized deliveries a week and restaurants are expected to have two (2) van-sized and four (4) 30' truck deliveries a week. Although exact retail tenants aren't known at this time, the retail plan was used to develop the loading estimates based on the anticipated types of retail stores desired at each parcel.
- It is anticipated that the movie theater would have two (2) van-sized, four (4) 30' truck deliveries per week and two (2) tractor-trailer deliveries per week.

Based on the above assumptions, the loading dock for Parcel F1 will receive approximately one (1) truck delivery per day. For Parcel G1, the residential load dock will receive approximately one moving truck per day, and the retail loading dock will receive approximately 1-2 deliveries per day. Likewise for Parcel G2, the residential load dock will receive approximately one moving truck per day, and the retail loading dock will receive approximately 1-2 deliveries per day. Parcel G3, would receive a similar 1-2 deliveries per day that would utilize on-street loading areas. Therefore, the amount of loading facilities contained within the development will be able to accommodate the expected truck activity.

### *2.1.3 Parking*

#### **Parking Supply**

Based on current District Zoning laws, the minimum parking for the project is as follows:

- One space per 10 seats for the movie theater uses;
- One space per 750 square feet in excess of 3,000 square feet for the retail uses; and
- One space per three dwelling units for the residential uses.

Table 6 shows a summary of the parking requirements and the proposed parking supply. As shown in the table, the zoning code requires a minimum of 200 parking spaces for the residential uses and 298 spaces for the non-residential uses (498



spaces total). The proposed development will satisfy the Zoning requirements by supplying 300 parking spaces for the residential uses and 337 spaces for the non-residential uses (637 spaces total).

**Table 6: Proposed Parking**

Parking	Zoning Requirement	Proposed
Parcel F1	250	337
Parcel G1 Residential	117	175
Parcel G1 Non-Residential	23	0*
Parcel G2 Residential	83	125
Parcel G2 Non-Residential	16	0*
Parcel G3	9	0*
<b>Total Residential</b>	<b>200</b>	<b>300</b>
<b>Total Non-Residential</b>	<b>298</b>	<b>337</b>

\* Zoning requirement for retail portions of G1, G2, & G3 are included in the parking provided on F1.

### Parking Demand - Residential

In order to calculate the peak parking demand for the Residential land uses, rates were obtained from the Institute of Transportation Engineers' (ITE) *Parking Generation*, 4<sup>th</sup> Edition. These rates were then adjusted to account for the use of alternative modes. Many people going to and from the proposed PUD will choose not to drive, as is commonplace throughout the District.

Table 7 provides a summary of the parking demand ratios assumed for the residential uses. *Parking Generation* gives a suburban parking ratio of 1.20 spaces per 1,000 square feet for the Residential land uses. In order to adjust the suburban parking ratio for the proposed PUD, the car ownership rates for the 2006-2010 American Community Survey portion of the U.S. Census for the Census tract containing the PUD (Census Tract 72) were investigated. Census data shows that approximately 45% of those surveyed did not own a private vehicle. Journey to work data was also investigated which suggested that 35% of all residential based trips in the Census Tract were auto oriented. Based on the vehicle ownership and journey to work data for the Census Tract and the proposed TDM program (outlined in Section 2.2.2), the parking demand was assumed to be reduced by approximately 60%, yielding a parking ratio of 0.48 spaces per 1,000 square feet. Based on the assumed parking demand ratios, the Residential uses will have a peak parking demand of approximately 281 spaces. This demand of 281 spaces can be adequately accommodated by the proposed supply of 300 spaces, which represents a parking ratio of 0.50 spaces per unit, which is consistent with other residential developments relatively accessible to good transit options that include Metrorail, Metrobus, DC Circulator, and future streetcar service.

**Table 7: Residential Parking Demand Calculations**

Land Use	Land Use Code <sup>6</sup>	Size	Parking Ratio	Estimated Urban Ratio	Peak Parking Demand
Parcel G1 – Low/Mid-Rise Apt	221	337,265 sf	1.20/1,000 sf	0.48/1,000 sf	162 spaces
Parcel G2 – Low/Mid-Rise Apt	221	247,276 sf	1.20/1,000 sf	0.48/1,000 sf	119 spaces
<b>Total</b>		<b>584,541 sf</b>	<b>1.20/1,000 sf</b>	<b>0.48/1,000 sf</b>	<b>281 spaces</b>

<sup>6</sup> *Parking Generation*, Institute of Transportation Engineers, 4<sup>th</sup> Edition

### Parking Demand – Theater/Retail

Table 8 provides a summary of the parking demand ratios assumed for the theater/retail uses. *Parking Generation* gives a peak suburban parking ratio of 0.15 spaces per seat for the multiplex theater land uses. In order to adjust the suburban parking ratio for the proposed PUD, a non-auto percentage of 40% was applied to reflect the same trip generation credit for transit that was used in the vehicular trip generation calculation. This percentage applied to the 0.15 spaces per seat ratio yielded a parking ration of 0.09 spaces per seat.

Similarly, the retail uses in blocks G1, G2, and G3 would provide a total of approximately 50,000 sf of retail. *Parking Generation* gives a peak suburban parking ratio of 4.67 vehicles per seat for the retail uses. In order to adjust the suburban parking ratio for the proposed PUD, a non-auto percentage of 60% was applied to reflect the same trip generation credit for transit that was used in the vehicular trip generation calculation. This percentage applied to the 4.67 spaces per seat ratio yielded a parking ration of 1.87 spaces per seat. The sum of the peak theater and peak retail demands yields a total peak supply of 318 spaces which can be served by the 337 spaces proposed as part of the F1 parcel garage.

**Table 8: Theater & Retail Parking Demand Calculations**

Land Use	Land Use Code <sup>7</sup>	Size	Parking Ratio	Estimated Urban Ratio	Peak Parking Demand
Parcel F1 – Multiplex Theater	445	2,500 seats	0.15/ seat	0.09/seat	225 spaces
Parcel G1 – Retail	820	20,000 sf	4.67/1,000 sf	1.87/1,000 sf	37 spaces
Parcel G2 – Retail	820	15,000 sf	4.67/1,000 sf	1.87/1,000 sf	28 spaces
Parcel G2 – Retail	820	15,000 sf	4.67/1,000 sf	1.87/1,000 sf	28 spaces
<b>Total</b>					<b>318 spaces</b>

In addition to the parking analysis summarized in Table 8, a shared parking study conducted by Carl Walker, Inc. (which can be found in the technical appendix) specifically for the F1 parcel theater development was referenced, and is summarized on Table 9. The Carl Walker study examined the demand generated by the movie theater as well as the development's retail uses. The demand was determined using the methodology outlined in the Urban Land Institute's (ULI) *Shared Parking* and was modified based upon the information provided by theater operators to more accurately depict ticket sales and, thus, parking demand throughout the year. The shared parking model includes adjustments for adjacent uses, such as the nearby retail that will be included in the PUD. Finally, the shared parking demand model assumed an overall mode share of 50% auto and vehicle occupancies of 2.2 people per vehicle.

The results of the shared parking study reveal off-peak (non-summer evening) demands for both weekdays and weekends and peak (summer or winter holiday evening) demands for both weekdays and weekends. As shown on Table 9 below, the movie theater and retail uses will experience a peak demand of 389 spaces during a peak winter holiday or summer weekend. Throughout the remainder of the year, a peak demand of 308 spaces can be expected on weekends. Similarly, 167 spaces can be anticipated to be occupied during peak winter holiday or summer weekday evenings while a demand of 112 spaces can be expected during the remainder of the weekdays during the year.

<sup>7</sup> *Parking Generation*, Institute of Transportation Engineers, 4<sup>th</sup> Edition

The peak demand of 389 spaces identified in the Walker study is greater than the proposed supply of 337 spaces. However, with the implementation of the Transportation Demand Management measures for the PUD, it is projected that the peak parking demand of the theater and retail uses of 389 spaces will be reduced to be supported by the proposed supply of the garage. The TDM measures that will be geared to address the parking demand include the transit incentives, the marketing of transit, and the market pricing of the garage parking.

**Table 9: Movie Theater/Retail Shared Parking Study Results from Walker Report**

Land Use	Off-Peak	Peak	Off-Peak	Peak
	Weekday	Weekday	Weekend	Weekend
	Demand	Demand	Demand	Demand
Movie Theater/Retail	112 spaces	167 spaces	308 spaces	389 spaces

**2.1.4 Bicycle Facilities**

As stated in Section 1, the site is directly served by signed bicycle routes and local streets that accommodate cycling. In order to accommodate and encourage cycling, the project will include short-term public bicycle spaces on streets, near building entrances, and public places. These short term spaces will include inverted U-racks placed in high-visibility areas. The Applicant is willing to work with DDOT in selecting locations for the racks in Public Space. The project will also include secured long-term bicycle parking within the parking garage, and changing facilities for retail employees.

The site planning package identifies a total of 269 bicycle parking spaces provided on site. Short term parking will be provided in Parcels F1, G1, and G2, with 44 spaces on Parcel F1, 10 on Parcel G1, and 10 on Parcel G2. An additional 205 long-term parking spaces are planned for Parcel G1 and G2, located within the residential parking garages.

**2.2 Transportation Demand Management**

Transportation Demand Management (TDM) is the application of policies and strategies used to reduce travel demand or to redistribute demand to other times or spaces. TDM 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.

TDM’s importance within the District is highlighted within section T-3.1 of the DC Comprehensive Plan, where it has its own dedicated section including TDM policies and actions. As stated in the Plan, the Washington DC, metropolitan region is a leader in developing and implementing TDM strategies. Typical TDM programs include:

- Carpooling/vanpooling, employee shuttles, and improvements that encourage bicycling and walking
- Financial incentives, such as preferential parking for ride-sharers and transit subsidies
- Congestion avoidance strategies, such as compressed work weeks, flexible work schedules and telecommuting

**2.2.1 Proposed TDM Plan**

The Transportation Demand Management (TDM) plan for the DC Water PUD is based on the DDOT expectations for TDM programs, modified to allow for performance monitoring. The Applicant proposes that upon construction, the project incorporate several TDM measures. At a certain point after opening, the success of the TDM measures will be measured, and the TDM plan adjusted if it is judged to not meet expectations.

The Applicant proposes the following TDM measures:

- The Applicant will comply with Zoning requirements to provide bicycle parking/storage facilities. This includes secure bicycle parking located in the garage for retail employees and long-term storage for residents.
- The Applicant will unbundle all parking costs from the cost of lease or purchase of residential units.
- Public parking costs will be set at no less than the charges of the lowest fee garage located within ¼ mile.
- The Applicant will identify a TDM Leader for the project (for planning, construction, and operations) and provide this information to DDOT and Zoning Enforcement.
- The Applicant will provide a Transportation kiosk in the residential lobbies, which will contain printed materials related to local transportation alternatives and will maintain a stock of materials at all times.
- The Applicant will provide website links to [CommuterConnections.com](http://CommuterConnections.com) and [goDCgo.com](http://goDCgo.com) on developer and property management websites.
- The Applicant will dedicate a total of two spaces on the G1 and/or G2 parcels for car sharing services to use with right of first refusal. These spaces will be available to members of the car sharing 24 hours a day, seven days a week, without restrictions.
- The Applicant will provide an on-site business center available to residents, which will provide access to internet services.
- The Applicant will work with DDOT to determine if a Capital Bikeshare station is desirable and feasible for the project site. If so, the Applicant will provide a location for a Capital Bikeshare station.
- Two years after the entire project is 90% occupied, the Applicant will perform a monitoring study of site trip generation. The site trips will be compared to the projected trip generation contained in this report. If the measured trip generation exceeds the projections, the Applicant will supplement the above TDM measures with additional ones, such as those from in *Incorporation of Transportation Demand Management (TDM) into the Development Review Process* suggested for a project of this size not listed above.

### 2.3 Compliance with Comprehensive Plan

The following table lists the transportation policies and actions from DC’s Comprehensive Plan that are relevant to the development review process. As noted in the table, the DC Water PUD complies with all of the relevant policies and actions from the Comprehensive Plan.

**Table 10: Relevant Comprehensive Plan Policies & Actions**

DC Comprehensive Plan Policy/Action related to transportation and development projects	Comments
<p><i>Policy T-1.1.2: Land Use Impact Assessment</i> Assess the transportation impacts of development projects using multimodal standards rather than traditional vehicle standards to more accurately measure and more effectively mitigate development impacts on the transportation network.</p>	<p>This transportation study includes discussion and analysis of transit, pedestrian, and bicycle traffic that exceeds a traditional transportation study, especially those performed in suburban environments.</p>
<p><i>Action T-1.1.A: Transportation Measures of Effectiveness</i> Develop new measures of effectiveness such as a multi-modal level of service standard to quantify transportation service and assess land use impacts on the transportation system.</p>	<p>DDOT has yet to develop a standard level of service to access land use impacts. The transportation engineering industry has no readily available metrics that can be easily used in the development review process beyond traditional vehicular capacity metrics. As stated above, this study includes discussion and analysis of transit, pedestrian and bicycle traffic that exceeds a traditional transportation study.</p>
<p><i>Action T-1.1.B: Transportation Improvements</i> Require transportation demand management measures and transportation support facilities such as crosswalks, bus shelters, and bicycle facilities in large development projects and major trip generators, including projects that go through the Planned Unit Development (PUD) Process.</p>	<p>This application includes many improvements to the site, including bicycle parking. In addition, the application meets and exceeds DDOT’s stated expectations for TDM measures.</p>
<p><i>Policy T-1.2.3: Discouraging Auto-Oriented Uses</i> Discourage certain uses, like “drive-through” businesses or stores with large surface parking lots, along key boulevards and pedestrian streets, and minimize the number of curb cuts in new developments. Curb cuts and multiple vehicle access points break-up the sidewalk, reduce pedestrian safety, and detract from pedestrian-oriented retail and residential areas.</p>	<p>The development does not contain any “drive-through” businesses and places a significant amount of parking in underground structures. Additionally all proposed curb cuts, with two exceptions, will be placed on private roadways internal to the PUD.</p>
<p><i>Action T-2.3.A: Bicycle Facilities</i> Wherever feasible, require large new commercial and residential buildings to be designed with features such as secure bicycle parking and lockers, bike racks, shower facilities, and other amenities that accommodate bicycle users.</p>	<p>As described above, the development contains a significant amount of bicycle features. This includes short- and long-term parking for retail and residential users.</p>

DC Comprehensive Plan Policy/Action related to transportation and development projects	Comments
<p><i>Action T-3.1.A: TDM Strategies</i>                      Develop strategies and requirements that reduce rush hour traffic by promoting flextime, carpooling, transit use; encouraging the formation of Transportation Management Associations; and undertaking other measures that reduce vehicular trips, particularly during peak travel periods. Identify TDM measures and plans as appropriate conditions for large development approval. Transportation Management Plans should identify quantifiable reductions in vehicle trips and commit to measures to achieve those reductions. Encourage the federal and District governments to explore the creation of a staggered workday for particular departments and agencies in an effort to reduce congestion.</p>	<p>The application has proposed to include TDM measures meeting DDOT’s expectations contained within <i>Incorporation of Transportation Demand Management (TDM) into the Development Review Process</i>.</p>
<p><i>Action T-3.2.D: Unbundle Parking Cost</i>                      Find ways to “unbundle” the cost of parking from residential units, allowing those purchasing or renting property to opt out of buying or renting parking spaces. “Unbundling” should be required for District-owned or subsidized development, and the amount of parking in such development should not exceed that required by Zoning. Further measures to reduce housing costs associated with off-street parking requirements, including waived or reduced parking requirements in the vicinity of Metrorail stations and along major transit corridors, should be pursued during the revision of the Zoning Regulations. These efforts should be coupled with programs to better manage residential street parking in neighborhoods of high parking demand, including adjustments to the costs of residential parking permits.</p>	<p>The applicant will unbundle all parking from the cost of renting residential units, as outlined above in the TDM measures.</p>

### 3: IMPACTS REVIEW

This section of the report focuses on the influence and impact site generated traffic will have on the local transportation network, with the following purpose:

- To provide information to the District Department of Transportation (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 are expected to travel to and from.
- To 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 analysis of intersection 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. The report describes what improvements to the transportation network are needed to mitigate adverse impacts.

#### 3.1 Site Transportation Demand

##### 3.1.1 Base Trip Generation

Traditionally, trip generation for a proposed development is calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 8<sup>th</sup> Edition. For this report, the methodology was supplemented to account for the urban nature of the site (*Trip Generation* provides data for non-urban, low transit use sites) and to generate trips for multiple modes. The following summarizes the methodology that was used in this study, which was approved by DDOT per the Scoping Form contained in the Technical Attachments.

First, ITE *Trip Generation* was used to develop base vehicular-trip rates, not accounting for reductions due to mode split. The *Trip Generation Handbook*, 2<sup>nd</sup> Edition was also consulted for guidelines for estimating trip generation. The following summarizes the trip generation projections:

- The Residential trips were projected based on Land Use (LU) 220 for Apartment, which are rental dwelling units located in buildings with at least three other dwelling units. The total weekday and Saturday trips, as well as the morning and afternoon weekday peak hour trips, were generated using the regression equations provided based on average vehicle trip ends per dwelling unit. The regression equations were chosen for the Residential projections, due to the high (over 0.75) coefficient of determinations ( $R^2$ ) for each time period. The Saturday peak hour trips were generated based on the average rate of trip generation per dwelling unit due to the low (less than 0.75) coefficient of determinations ( $R^2$ ) for the time period. For the residential uses, the weekday morning and afternoon peak hours generally correspond to the peak hours of the adjacent roadway network – one hour between 7:00 and 9:00 AM and between 4:00 and 6:00 PM, respectively. Based on this, the peak hour of the adjacent roadway network was used for the trip generation projection instead of the peak hours of the Generator. *Trip Generation* does not provide information on when Residential uses peak during a typical Saturday.
- For the Retail trips, LU 820 for Shopping Center was applied in lieu of individual trip rates, such as bank, pharmacy, and supermarket, for the retail uses because applying individual rates would not account for interaction between the retail uses (shoppers visiting more than one store). The Shopping Center trip rate accounts for these uses and interactions. All of the trip projections were generated based on the average rates provided based on average vehicle trip ends per 1,000 square feet of gross leasable area. According to the *Trip Generation Handbook*, the

weighted average rate should be used to estimate trip rates for land uses with low value independent variables. This is due to the y-intercept of the regression equation, which can yield an illogical trip projection. Although the coefficient of determination ( $R^2$ ) for the regression equations provided is high (above 0.75), the average rates were used due to the low square footage of retail provided (under 50,000 SF). *Trip Generation* provides information on the hourly variation of shopping center traffic for shopping centers with less than 100,000 square feet. For the weekday trips, the morning and afternoon peak hours of the shopping center typically do not coincide with the peak hours of the adjacent roadway network. Based on this, the peak hour of the adjacent roadway network was used for the trip generation projection instead of the peak hours of the Generator. For the Saturday data, the hour with the highest percentage of entering and exiting traffic occurs on Saturdays from 4:00 PM – 5:00 PM.

- Cinema trips were projected based on LU 445 for Multiplex Movie Theater, which is a theater with audience seating, a minimum of ten (10) screens, a lobby, and a refreshment area. Theaters included in this category are primarily stand-alone facilities with separate parking and dedicated driveways and typically have a smaller number of seats per screen than traditional theaters. All of the trip projections were generated based on the average rates provided based on average vehicle trip ends per seat. The rates were used because either a regression equation was not provided or because of the low (less than 0.75) coefficient of determinations ( $R^2$ ) for the time period. The weekday afternoon peak hour of the adjacent street traffic was used to project the weekday afternoon peak period trips. The total weekday trips were estimated based on factoring the afternoon peak hour trips by ten (10). Morning peak hour trips were not generated as no data is provided in *Trip Generation* and because the Cinema is not expected to operate during the morning peak hour. For the Saturday trips, the peak hour of the Generator was used to project the number of peak hour trips, and the total daily trips were estimated based on factoring the peak hour trips by ten (10). *Trip Generation* indicates that the peak hour of the Generator typically occurs on Friday and Saturday evenings between 6:00 PM and 10:00 PM.

Following the base vehicular- trip rate calculations, the vehicle-trips were converted to person-trips based on the estimated average vehicle occupancy (AVO). AVO rates were obtained from the *Summary of Travel Trends – 2009 National Household Travel Survey* performed by the U.S. Department of Transportation Federal Highway Administration. Based on the information contained in the report, Table 11 shows the AVO assumed for each land use<sup>8</sup> and the base number of trips generated by the proposed development.

### 3.1.2 Mode Split

Following the base trip generation shown in Section 3.1.1, the trips were split into each mode: transit (consisting of both Metrorail and Metrobus), walking, biking, and vehicle. Each land use was analyzed by mode separately in order to account for varying mode splits. The mode split estimates for the DC Water PUD were developed using survey information contained in several sources: WMATA's *2005 Development-Related Ridership Survey*, U.S. Department of Transportation's *2009 National Household Travel Survey (NHTS) Summary of Travel Trends*, *Commuter Connections' 2010 State of the Commute Survey Report*, results from the 2006-2010 American Community Survey, and files from Gorove/Slade's library. The following describes in detail how the mode split assumptions were assembled based on information from these sources. These assumptions were approved by DDOT per the Scoping Form contained in the Technical Attachments

<sup>8</sup> AVO rates obtained from "Table 16: Average Vehicle Occupancy for Selected Trip Purpose 1977, 1983, 1990, and 1995 NPTS, and 2001 and 2009 NHTS (Person Miles per Vehicle Mile" for 2009 data. AVO for Retail uses based on "Shopping" Trip Purpose. AVO for Office and Residential uses based on "To or From Work" Trip Purpose.



**Table 11: Base Vehicle- and Person-Trips Generated**

Land Use	Size	Trip Generation											
		AM Peak Hour			PM Peak Hour			Weekday Total	Sat Peak Hour			Saturday Total	
		In	Out	Total	In	Out	Total		In	Out	Total		
<b>Vehicle Trips</b>													
Retail – Parcel F1	2,026	Square Feet	1	1	2	4	4	8	88	5	5	10	102
Retail – Parcel G1	20,000	Square Feet	12	8	20	37	38	75	860	51	47	98	1,000
Retail – Parcel G2	15,000	Square Feet	9	6	15	27	29	56	646	38	36	74	750
Retail – Parcel G3	10,000	Square Feet	6	4	10	19	19	38	430	26	24	50	500
Total Retail			28	19	47	87	90	177	2,024	120	112	232	2,352
Cinema	2,500	Seats	--	--	--	72	128	200	2,0000	390	360	750	7,500
Apartments – Parcel G1	350	Dwelling Units	35	140	175	137	73	210	2,246	82	81	163	2,492
Apartments – Parcel G2	250	Dwelling Units	25	101	126	101	54	155	1,640	61	61	122	1,708
Total Residential			60	241	301	238	127	365	3,886	143	142	285	4,200
<b>Total Vehicle-Trips</b>			<b>88</b>	<b>260</b>	<b>348</b>	<b>397</b>	<b>345</b>	<b>742</b>	<b>7,910</b>	<b>653</b>	<b>614</b>	<b>1,267</b>	<b>14,052</b>
<b>Person-Trips</b>													
Retail	1,78	Persons/Vehicle	50	34	84	155	160	315	3,603	214	199	413	4,187
Cinema	2,20	Persons/Vehicle	--	--	--	158	282	440	4,400	858	792	1,650	16,500
Residential	1,13	Persons/Vehicle	68	272	340	269	143	412	4,391	162	160	322	4,746
<b>Total Person-Trips</b>			<b>118</b>	<b>306</b>	<b>424</b>	<b>582</b>	<b>585</b>	<b>1,167</b>	<b>12,394</b>	<b>1,234</b>	<b>1,151</b>	<b>2,385</b>	<b>25,433</b>

## Residential Uses

Several sources provide mode split information that can be used to develop estimates for future residents of the DC Water Site PUD, including results from the 2007-2011 American Community Survey, WMATA's *Ridership Survey* of residential sites within the District, and The *State of the Commute* report, which contains the average mode split of commuters that live in the District. The mode splits from these three sources are shown in Table 12.

**Table 12: Mode Split Information for Residential Uses**

Information Source	Mode			
	<i>Metrorail/Train</i>	<i>Metrobus &amp; Other Transit</i>	<i>Auto</i>	<i>Walk &amp; Other</i>
2007-2011 American Community Survey <sup>9</sup>	30%	3%	35%	32%
State of the Commute <sup>10</sup>	27%	14%	48%	11%
WMATA Ridership Survey <sup>11</sup>	43%	6%	39%	14%

Of these three sources of information, the one that most closely contains the transportation characteristics of the PUD would be the census information from the tracts where the site is located. The sites that comprise the *Ridership Survey's* average mode splits do not compare well based on location and distance from the Metrorail station. The *State of the Commute* is an average for the entire District making it less likely to represent the project compared to the census data.

Thus, this report uses the census information as a starting point for assembling residential mode split assumptions. The percentages listed in the above table were simplified in order to compare the three sources to each other. The census data has a more detailed breakdown as follows:

- Drive alone: 32%
- Carpool: 3%
- Bus: 3%
- Metrorail: 30%
- Walk: 30%
- Bike: 2%

Based on the census data, combined with the WMATA data in order to provide a conservative estimate, the assumptions on residential mode split for the DC Water Site PUD are as follows:

- Drive: 45% (with 1.13 persons per car<sup>12</sup>)
- Transit: 40%
- Walk: 12%
- Bike: 3%

The mode split for the residential trips is compared to the mode split assumed by Gorove/Slade for other projects located along the M Street SE/SW corridor, previously approved by DDOT. Table 18 summarizes the mode split assumptions for adjacent developments.

<sup>9</sup> Based on information for Census Tract 72, which contains the site. Answers for 'telecommuting' and 'other' were not included.

<sup>10</sup> Survey respondents that live within the District

<sup>11</sup> For 'Suburban-Inside the Beltway' locations

<sup>12</sup> According to the 2009 *National Household Travel Survey* published by the U.S. Department of Transportation Federal Highway Administration, based on the Average Vehicle Occupancy for trips "To or From Work"

**Table 13: Mode Split Assumptions for Residential Trips**

Project	Mode Split			
	Vehicle	Transit	Walk	Bike
<b>DC Water Site</b>	<b>45%</b>	<b>40%</b>	<b>12%</b>	<b>3%</b>
Square 701 (Ballpark Square)	45%	45%	7%	3%
RiverFront on the Anacostia (Florida Rock)	40%	40%	15%	5%
The Wharf	31%	49%	15%	5%

The mode splits are the same as those assumed by Gorove/Slade, as approved by DDOT, for the Square 701 (Ballpark Square) development in August 2012. The mode splits are more conservative than those assumed by Gorove/Slade, as approved by DDOT, for the RiverFront on the Anacostia PUD (Florida Rock) in August 2012, which is located adjacent to the proposed DC Water Site PUD. The mode splits are also more conservative than those assumed by Gorove/Slade, as approved by DDOT, for The Wharf development in May 2012, which is located an approximately equal distance from the nearest Metrorail station. Therefore, the residential mode splits assumed for the DC Water Site will provide a conservative analysis.

### Retail Uses

The main source of mode split information for retail sites is WMATA's *Ridership Survey*. Contained within the report are summaries of mode splits for five retail sites within the Metropolitan area and one within the District. However, no one site closely models the transportation and site characteristics of the DC Water Site PUD, although the Crystal City Station Area is likely the closest match. The following table summarizes the mode split information for the Crystal City Station Area, as well as for all of the retail sites surveyed.

**Table 14: WMATA Ridership Survey Mode Split for Retail Sites**

Retail Location	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
Crystal Plaza Shops	36%	5%	24%	36%
The Underground	31%	6%	27%	35%
All retail sites surveyed	29%	8%	36%	27%

This report uses the average mode splits for all retail sites surveyed as a basis for retail mode splits for the PUD, with some modifications made in order to assume a conservative mode split. The mode split for the retail trips is broken down as follows:

- Drive: 40% (with 1.78 persons per car<sup>13</sup>)
- Transit: 40%
- Walk: 15%
- Bike: 5%

The mode split for the retail trips is compared to the mode split assumed by Gorove/Slade for other projects located along the M Street SE/SW corridor, previously approved by DDOT. Table 18 summarizes the mode split assumptions for adjacent developments.

<sup>13</sup> According to the 2009 National Household Travel Survey published by the U.S. Department of Transportation Federal Highway Administration, based on the Average Vehicle Occupancy for "Shopping" trips

**Table 15: Mode Split Assumptions for Retail Trips**

Project	Mode Split			
	Vehicle	Transit	Walk	Bike
DC Water Site	40%	40%	15%	5%
Square 701	40%	40%	15%	5%
RiverFront on the Anacostia	35%	40%	20%	5%
The Wharf	19%	56%	15%	10%

The mode splits are the same as those assumed by Gorove/Slade, as approved by DDOT, for the Square 701 development in August 2012. The mode splits are more conservative than those assumed by Gorove/Slade, as approved by DDOT, for the RiverFront on the Anacostia PUD in August 2012, which is located adjacent to the proposed DC Water Site PUD. The mode splits are also significantly more conservative than those assumed by Gorove/Slade, as approved by DDOT, for The Wharf development in May 2012, which is located an approximately equal distance from the nearest Metrorail station. Therefore, the retail mode splits assumed for the DC Water Site will provide a conservative analysis.

**Theater Uses**

The main source of mode split information for retail sites is WMATA’s *Ridership Survey*. Contained within the report are summaries of mode splits for four entertainment sites within the Metropolitan area, with none located within the District. However, based on discussions with DDOT in order to present a conservative scenario, it was determined that the Majestic 20 in Silver Spring, Maryland is likely the best match given the densities in Silver Spring as are planned in the Yards area, the comparable proximity of the cinema to the Metro, and the comparable nature of films anticipated to be shown at the cinema at the DC Water Site. The Majestic 20 Theater is located approximately 1,900 feet from the Silver Spring Metro Station, while the cinema at the DC Water site is planned to be located approximately 1,000 feet from the Navy Yard Metro Station. The following table summarizes the mode split information for the Majestic 20 Theater, as well as for all of the entertainment sites surveyed.

**Table 16: WMATA Ridership Survey Mode Split for Entertainment Sites**

Entertainment Location	Mode			
	Metrorail	Metrobus & Other Transit	Auto	Walk & Other
Majestic 20 Theater	19%	13%	56%	13%
All entertainment sites surveyed	26%	6%	57%	11%

This report uses the mode splits for the Majestic 20 Theater site as a basis for the theater mode splits for the PUD, with some modifications made in order to assume a conservative mode split. The mode split for the theater trips is broken down as follows:

- Drive: 60% (with 2.20 persons per car<sup>14</sup>)
- Transit: 30%
- Walk: 5%
- Bike: 5%

<sup>14</sup> According to the 2009 National Household Travel Survey published by the U.S. Department of Transportation Federal Highway Administration, based on the Average Vehicle Occupancy for “Social and Recreational” trips

In comparison, the mode split for the theater trips was compared to the mode split assumed by Gorove/Slade for other projects located along the M Street SE/SW corridor, previously approved by DDOT. Table 18 summarizes the mode split assumptions for adjacent developments.

**Table 17: Mode Split Assumptions for Theater Trips**

Project	Mode Split			
	Vehicle	Transit	Walk	Bike
DC Water Site	60%	30%	5%	5%
The Wharf	39%	44%	12%	5%

The mode splits are more conservative than those used by Gorove/Slade, as approved by DDOT, for The Wharf development in May 2012, which is located an approximately equal distance from the nearest Metrorail station. No other theater or entertainment uses are located within the study area for comparison. Therefore, the theater mode splits assumed for the DC Water Site will provide a conservative analysis.

**Summary**

Table 18 summarizes the mode split assumptions for the DC Water Site PUD.

**Table 18: Mode Split Assumptions**

Land Use	Mode Split				Average Vehicle Occupancy
	Vehicle	Transit	Walk	Bike	
Residential	45%	45%	7%	3%	1.13
Retail	40%	40%	15%	5%	1.78
Theater	60%	30%	5%	5%	2.20

**3.1.3 Multi-Modal Trip Generation**

Based on the trip generation calculations outlined in Section 3.1.1 and the mode split assumptions shown in Section 3.1.2 (and summarized in Table 18), Table 19 shows the resulting calculations by mode.

In addition to projecting the trip generation by mode, the trip generation projections were calculated by phase. As stated in Section 2, the proposed PUD has an initial phase of development (Phase 1), which will include the Cinema and approximately 2,000 square feet of retail uses. The full build-out of the PUD will contain the remaining 45,000 square feet of Retail uses and approximately 600 residential dwelling units.

In order to measure the impacts of Phase 1 separate from the full build-out of the PUD, Table 20 shows the trip generation calculations by Phase.

**Table 19: Trip Generation for Proposed Development by Mode**

Land-Use/Mode	Trip Generation by Mode										
	AM Peak Hour			PM Peak Hour			Daily Total	Saturday Peak Hour			Saturday Total
	In	Out	Total	In	Out	Total		In	Out	Total	
<b>Vehicle Trips</b>											
Residential	27	108	135	107	58	165	1,749	65	62	127	1,890
Cinema	-	-	-	43	77	120	1,200	234	216	450	4,500
Retail	11	8	19	35	36	71	810	48	45	93	941
<i>Total New Vehicle Trips</i>	<b>38</b>	<b>116</b>	<b>154</b>	<b>185</b>	<b>171</b>	<b>356</b>	<b>3,759</b>	<b>347</b>	<b>323</b>	<b>670</b>	<b>7,331</b>
<b>Transit Person-Trips</b>											
Residential	27	109	136	108	57	165	1,756	65	64	129	1,898
Cinema	-	-	-	47	85	132	1,320	257	238	495	4,950
Retail	20	14	34	62	64	126	1,441	86	79	165	1,675
<i>Total New Transit Person-Trips</i>	<b>47</b>	<b>123</b>	<b>170</b>	<b>217</b>	<b>206</b>	<b>423</b>	<b>4,517</b>	<b>408</b>	<b>381</b>	<b>789</b>	<b>8,523</b>
<b>Walking Person-Trips</b>											
Residential	8	33	41	32	17	49	527	19	20	39	570
Cinema	-	-	-	8	14	22	220	43	40	83	825
Retail	8	5	13	23	24	47	540	32	30	62	628
<i>Total New Walking Person-Trips</i>	<b>16</b>	<b>38</b>	<b>54</b>	<b>63</b>	<b>55</b>	<b>118</b>	<b>1,287</b>	<b>94</b>	<b>90</b>	<b>184</b>	<b>2,023</b>
<b>Bicycling Person-Trips</b>											
Residential	2	8	10	8	4	12	132	5	5	10	142
Cinema	-	-	-	8	14	22	220	43	40	83	825
Retail	3	1	4	8	8	16	180	11	10	21	209
<i>Total New Bicycling Person-Trips</i>	<b>5</b>	<b>9</b>	<b>14</b>	<b>24</b>	<b>26</b>	<b>50</b>	<b>532</b>	<b>59</b>	<b>55</b>	<b>114</b>	<b>1,176</b>
<b>Total Trips*</b>	<b>106</b>	<b>286</b>	<b>392</b>	<b>489</b>	<b>458</b>	<b>947</b>	<b>10,095</b>	<b>908</b>	<b>849</b>	<b>1,757</b>	<b>19,053</b>

\* - Combination of person-trips and vehicle-trips

**Table 20: Trip Generation for Proposed Development by Phase**

Land-Use/Mode	Trip Generation by Phase										
	AM Peak Hour			PM Peak Hour			Daily Total	Saturday Peak Hour			Saturday Total
	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>		<i>In</i>	<i>Out</i>	<i>Total</i>	
<b>Vehicle Trips</b>											
Phase 1	0	0	1	45	79	123	1,235	236	218	454	4,541
Full Build-Out	38	116	153	140	92	233	2,524	111	105	216	2,790
<i>Total New Vehicle Trips</i>	<b>38</b>	<b>116</b>	<b>154</b>	<b>185</b>	<b>171</b>	<b>356</b>	<b>3,759</b>	<b>347</b>	<b>323</b>	<b>670</b>	<b>7,331</b>
<b>Transit Person-Trips</b>											
Phase 1	1	1	1	50	88	137	1,382	261	241	502	5,022
Full Build-Out	46	122	169	167	118	286	3,135	147	140	287	3,501
<i>Total New Transit Person-Trips</i>	<b>47</b>	<b>123</b>	<b>170</b>	<b>217</b>	<b>206</b>	<b>423</b>	<b>4,517</b>	<b>408</b>	<b>381</b>	<b>789</b>	<b>8,523</b>
<b>Walking Person-Trips</b>											
Phase 1	0	0	1	9	15	24	243	44	41	86	852
Full Build-Out	16	38	53	54	40	94	1,044	50	49	98	1,171
<i>Total New Walking Person-Trips</i>	<b>16</b>	<b>38</b>	<b>54</b>	<b>63</b>	<b>55</b>	<b>118</b>	<b>1,287</b>	<b>94</b>	<b>90</b>	<b>184</b>	<b>2,023</b>
<b>Bicycling Person-Trips</b>											
Phase 1	0	0	0	8	14	23	228	43	40	84	834
Full Build-Out	5	9	14	16	12	27	304	16	15	30	342
<i>Total New Bicycling Person-Trips</i>	<b>5</b>	<b>9</b>	<b>14</b>	<b>24</b>	<b>26</b>	<b>50</b>	<b>532</b>	<b>59</b>	<b>55</b>	<b>114</b>	<b>1,176</b>
<b>Total Trips*</b>	<b>106</b>	<b>286</b>	<b>392</b>	<b>489</b>	<b>458</b>	<b>947</b>	<b>10,095</b>	<b>908</b>	<b>849</b>	<b>1,757</b>	<b>19,053</b>

\* - Combination of person-trips and vehicle-trips

### 3.2 Roadway Capacity and Operations

This section details the vehicular trips generated in the study area along the vehicular access routes, defines the analysis assumptions, analyzes the vehicular impacts of the proposed development, and makes recommendations for improvements where needed.

#### 3.2.1 Scope of Analysis

The purpose of the vehicular capacity analysis is to determine the existing conditions of the intersections located in the immediate vicinity of the proposed development. The following intersections were selected, as shown in Figure 13:

- South Capitol Street and I Street
- 1<sup>st</sup> Street SE and I Street SE
- New Jersey Avenue SE and I Street SE
- South Capitol Street Southbound and M Street
- South Capitol Street Northbound and M Street
- Half Street SE and M Street SE
- 1<sup>st</sup> Street SE and M Street SE
- New Jersey Avenue SE and M Street SE
- 4<sup>th</sup> Street SE and M Street SE
- 5<sup>th</sup> Street SE and M Street SE
- South Capitol Street and N Street
- 1<sup>st</sup> Street SE and N Street SE
- New Jersey Avenue SE and N Street SE
- 1<sup>st</sup> Street SE and N Place SE
- 1<sup>st</sup> Street SE and O Street SE
- South Capitol Street and Potomac Avenue

In addition to the study intersections listed above, the following intersection are included in the future analyses, as shown in Figure 14:

- 1½ Street SE and M Street SE
- 1½ Street SE and N Street SE
- 1½ Street SE and N Place SE
- 1½ Street SE and O Street SE
- 1<sup>st</sup> Street SE and Potomac Avenue SE
- All Site Driveways

These intersections were previously approved by DDOT per the Scoping Form presented in the Technical Attachments. (Of note, the planned intersection of 1½ Street SE and M Street SE is not included in the future analysis as the roadway is currently proposed to be constructed along with adjacent development at the Yards, which is not yet designed and approved.) Intersection capacity analyses were performed for the existing conditions at each intersection within the study area during the morning and afternoon peak hours, as well as for future conditions with and without the proposed development. Given the site's proximity to the Washington Nationals' Ballpark and the entertainment uses proposed for the site, weekday PM peak period on a Washington Nationals' game day and Saturday evening peak period conditions were also examined. The study scenarios are as follows:

- Existing Conditions
- Future Conditions without Development (2016 Background)
- Future Conditions with Phase 1 Development (2016 Future)
- Future Conditions with Full Build-Out (2027 Future)



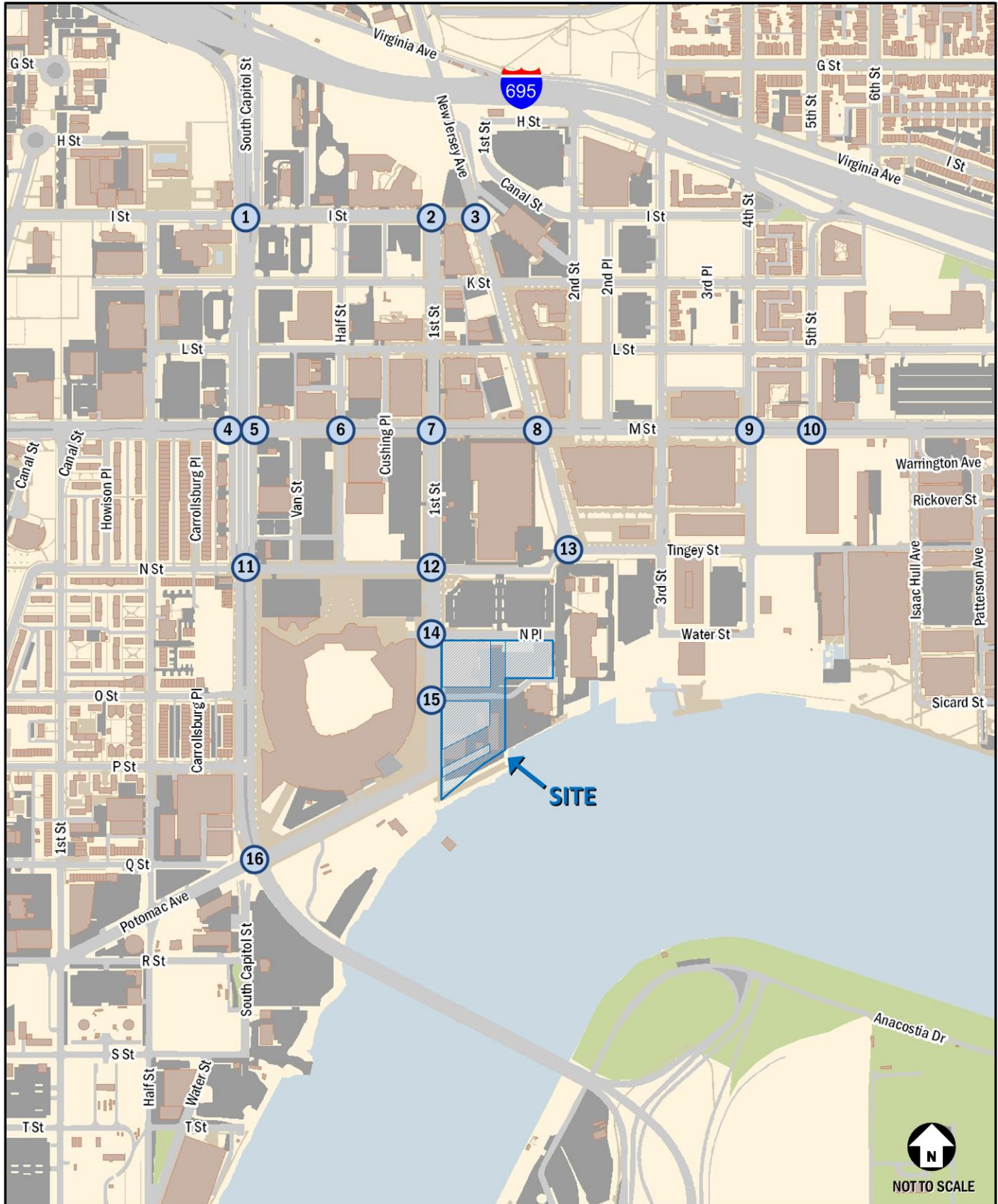


Figure 13: Existing Study Intersections

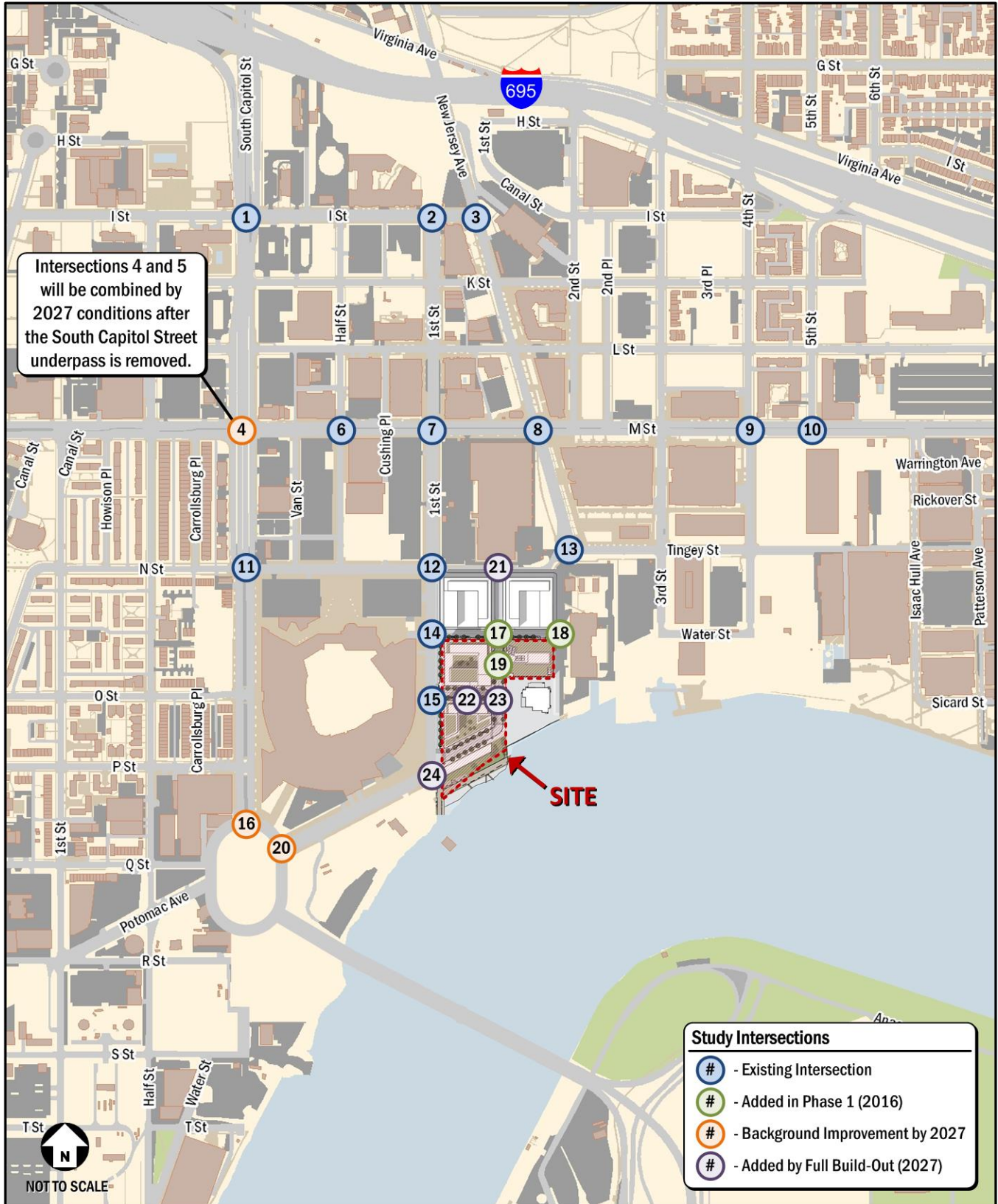


Figure 14: Future Study Intersections

The *Synchro, Version 7.0* software package was used to analyze the study intersections based on the Highway Capacity Manual (HCM) methodology. The *Synchro* model was compiled using signal timings provided by DDOT and with lane configurations and traffic volumes collected by Gorove/Slade. The following sections review the assumptions made for the technical analyses, as summarized in Table 24.

### 3.2.2 Traffic Volume Assumptions

The following section reviews the traffic volume assumptions made and methodologies used in the roadway capacity analyses, summarized in Table 24.

#### **Existing Conditions**

The overall purpose of this study is to show what effect the proposed development will have on the transportation system in the study area. The existing conditions in and around the site are characterized in order to provide a foundation for assessing the transportation implications of the proposed development. This is determined by examining the peak traffic hours, which are directly associated with the peaking characteristics of the site and the adjacent transportation system. These peaking characteristics are found through analysis of existing count data.

DDOT and National standards require that traffic counts be conducted on a weekday, not including Monday or Friday, when traffic conditions can be described as “typical”. This includes the consideration for adjacent uses, such as retail, special events, and recreation facilities and for major traffic generators, such as the area public school system or any large public or private institutions. Weekend and other off-peak periods are also often reviewed if the study area includes other uses that may be relatively inactive during the “typical” weekday.

The traffic counts conducted on a “typical” day are used to determine the morning and afternoon “peak hour” of traffic within the study area. According to the Highway Capacity Manual (HCM) methodologies, a one-hour analysis period is preferred. Analysis periods that exceed one hour are not usually used because traffic conditions are typically not steady for long time periods and because the adverse impact of short peaks in traffic demand may not be detected in a long time period. The “peak hour” represents the most conservative scenario, when the system traffic volumes are the highest. The use of “typical” weekday morning and afternoon peak hours are used to ensure that conclusions regarding adverse impacts and their respective mitigation measures apply to the vast majority of time roadways are used in the study area. Although there may be times when volume flows exceed these conditions, such as during special events, holiday weekends, or other times depending on the study area and site location, it is the industry standard to design transportation infrastructure for the peak times during “typical” weekdays.

In order to ensure that the data collected contains the peak hour, traffic counts are taken for a period of several hours during the morning and afternoon peak periods. From these peak periods, a peak hour is derived for both the morning and the afternoon time periods. According to the Transportation Impact Analyses for Site Development Manual published by the Institute of Transportation Engineers (ITE), data is generally collected during the weekday morning (7:00 to 9:00 AM) and afternoon (4:00 to 6:00 PM) peak hours. Although this is the standard, Gorove/Slade usually collects data for a three-hour (or longer) period to ensure that the peak hour is contained within the data collection timeframe.

The peak period counts are analyzed to determine the one hour that contains the highest cumulative directional traffic demands. From each peak period count, the morning and afternoon “peak hours” are determined by summing up the four fifteen-minute consecutive time periods in the study area that experience the highest cumulative traffic volumes. These “peak hours” are analyzed for the system of intersections investigated, choosing the “peak hour” of the entire system instead of each individual intersection.

Following the above guidelines, traffic counts, including vehicular and pedestrian volumes, were conducted by Gorove/Slade at the key study intersections between the hours of 6:30 and 9:30 AM and between 4:00 and 7:00 PM on Thursday, March 21, 2013. In addition to these traffic counts, additional volumes were obtained from the files of Gorove/Slade for several of the study area intersections. These traffic volumes were collected on Tuesday, September 14, 2010; Wednesday, September 15, 2010; Wednesday, September 28, 2011; and Wednesday, March 28, 2012. These count dates represent “typical” weekdays and weekends when the DC public school systems were in session, as well as the surrounding counties in Maryland and Virginia. The “typical” weekdays also represent time periods that include normal operation for other major traffic generators in the study area.

As stated above, weekend and other off-peak periods are often reviewed if the study area includes other uses that may be relatively inactive during the “typical” weekday. For the proposed PUD, two additional peak periods are analyzed in order to determine the potential impacts of the proposed development during these periods. Due to the Cinema uses, an additional Saturday evening peak period was analyzed. As stated in Section 3.1.1, Cinema uses typically peak on Friday and Saturday evenings between 6:00 and 10:00 PM. In order to account for this peak period of the Cinema, traffic counts were collected at the study intersections between the hours of 5:00 and 9:00 PM on Saturday, March 16, 2013 and Saturday, March 23, 2013. Due to the adjacent Washington Nationals’ Ballpark, an additional afternoon peak period was analyzed in order to assess the impacts of the proposed development during a “Game Day” scenario. Traffic counts for the “Game Day” scenario were collected on a weekday afternoon on a Washington Nationals game day on Tuesday, April 9 and Wednesday, April 10, 2013.

The morning and afternoon weekday peak hours for the system of intersections being studied occurred between 7:45 – 8:45 AM and 4:30 – 5:30 PM, respectively. The Saturday evening peak hour for the system of intersections occurred between 5:15 and 6:15 PM. For the “Game Day” scenario, the weekday afternoon peak hour (4:30 – 5:30 PM) was analyzed.

Existing peak hour traffic volumes are shown on Figure 16 and Figure 17 for the morning and afternoon peak hours, Saturday evening peak hour, and afternoon peak “Game Day” scenario. Figure 18 and Figure 19 show the peak hour pedestrian volumes collected. The results of the traffic counts are included in the Technical Attachments.

#### **2016 Future Conditions without Development (2016 Background)**

Phase 1 of the DC Water PUD is anticipated to be complete in 2016. The traffic projections for the future condition without the development consist of the traffic generated by background developments with planned completion by 2016 from the list in the Section 1.7.2 of this report and inherent traffic growth on the roadways added to the existing traffic volumes.

Of the developments listed in Section 1.7.2, only those that meet the criteria of being approved and having an origin/destination within the study area are included in the 2016 Background scenario. The following developments fit the criteria for inclusion in the 2016 Background scenario:

- Akridge Half Street/Square 700
- Arthur Capper/Carrollsbury and Capitol Quarter (those parcels projected to be completed by 2016)
- The Yards at Southeast Federal Center (those parcels projected to be completed by 2016)
- Florida Rock/RiverFront on the Anacostia (those parcels projected to be completed by 2016)
- Square 699/Velocity (Phase 2)

- 1111 New Jersey Avenue
- Half Street Phase II/Monument Properties
- Square 701
- Camden South Capitol
- Building 170
- Ballpark Hotel

Available background development traffic studies were used to determine the number of trips added for the background developments. This includes the “Monument Ballpark – Square 700 & 701 Transportation Impact Study” performed by Wells + Associates in December 2006, the “Square 700 Development Traffic Impact Assessment” performed by Gorove/Slade in January 2009, the “RiverFront on the Anacostia PUD Transportation Impact Study” performed by Gorove/Slade in August 2012, the “Square 701 Development Transportation Impact Study” performed by Gorove/Slade in September 2012, the “Ballpark Hotel Transportation Impact Study” performed by Gorove/Slade in October 2012, and the “One M Street Development Transportation Impact Study” performed by Gorove/Slade in December 2012. These documents were used to determine the number of trips generated by the aforementioned background developments, the mode split percentages, and the trip routing.

Trip generation for the other background developments, as well as the trip generation for the Saturday peak hour when not included in the original study, was calculated based on the methodology outlined in the Institute of Transportation Engineers’ (ITE) *Trip Generation*, 8<sup>th</sup> Edition. For developments consisting of a mix of retail uses with office, residential, or hotel uses, a 20% internal capture reduction was applied for retail trips originating from within the proposed development. The Shopping Center trip rate was applied in lieu of individual trip rates, such as bank, pharmacy and supermarket, for the retail uses because applying individual rates would not account for interaction between the retail uses (shoppers visiting more than one store), and the Shopping Center trip rate does account for these uses and interactions. Additionally, the General Office Building, Residential Apartments, and Residential Condominiums/Townhomes rates were applied for office and residential uses to estimate trips generated by the background developments.

For this report, the methodology was supplemented to account for the urban nature of the site (Trip Generation provides data for non-urban, low transit use sites). The WMATA Ridership Survey was used to determine transit reduction rates in order to account for trips taken by walking, bicycling, and transit. The mode split assumptions were based on the patterns and general findings from that document, observations of existing traffic, and the type and density of surrounding land uses. It was assumed that retail uses would generate a lot of local demand and therefore, have the highest assumed percentage of walking and biking trips. Residential based trips would be the most likely to use public transit, since they will be regular users that will be able to figure out and take advantage of the various routes and schedules. Although the location of the site near several major highways could lead to driving mode splits, the Metrorail, Metrobus, and DC Circulator service will be utilized to reach destinations in downtown areas of the District and to surrounding areas.

Table 21, shown below, summarizes the mode split assumptions for the background developments. Table 22 shows the total number of trips generated by the background developments. The trips generated for each background development are shown in the Technical Attachments. (Of note, the methodology outlined above for the background trip generation was utilized in previous studies, as approved by DDOT. This includes the Transportation Impact Studies performed for the RiverFront on the Anacostia PUD, the Square 701 Development, the Ballpark Hotel Development, and the One M Street Development.)

**Table 21: Mode Split Assumptions for Background Developments**

Land Use	Mode Split			
	Vehicle	Transit	Walk	Bike
Office	50%	35%	10%	5%
Retail/Restaurant	25%	35%	30%	10%
Residential	35%	45%	15%	5%
Hotel	35%	45%	15%	5%

These trips were then distributed and assigned to the network. Where a background study was not available, trips generated by the background developments were distributed using an analysis based on Metropolitan Washington Council of Governments (MWCOG) transportation planning models. Data from Traffic Analysis Zones (TAZs), including home-based and non-home-based trips, were used to determine the inbound and outbound vehicular trip distribution. The data used encompassed trips to and from the Southwest Waterfront development in 2010 and 2030. The data obtained from the MWCOG model was used in order to estimate the directions of approach for the study area. The major routes originate from the Francis Case Memorial Bridge/Southwest Freeway (I-395) and the George Mason Memorial Bridge/14<sup>th</sup> Street Bridge (Route 1) from the west, Maine Avenue SW from the west, 9<sup>th</sup> Street/12<sup>th</sup> Street from the north, 7<sup>th</sup> Street from the north, I-395 from the north, the Southeast Freeway/John Philip Sousa Bridge from the south and east, the 11<sup>th</sup> Street Bridges (I-295) from the south and east, and the Frederick Douglas Bridge/South Capitol Street from the south. Some trips will also originate from the local area roadways as well. One trip distribution was assumed for all land uses because the MWCOG data for Southwest Waterfront aggregated all land uses for each TAZ. Figure 15 shows the direction of approach for the background developments.

In addition to the background developments, other traffic increased due to inherent growth on the study area roadways were accounted for with a 1.5% per year growth rate compounded annually over the study period (existing-2016). This rate was estimated based on a comparison between existing and past average annual weekday traffic volumes obtained from DDOT for 202-2010. This growth rate was applied to all traffic volumes in the study area, with the exception of those traveling along South Capitol Street. The traffic volumes obtained for South Capitol Street show a negative percent growth rate over the 2002-2010 period. However, a 0.25% per year growth rate, compounded annually over the study period, was applied to the South Capitol Street volumes in order to provide a conservative analysis.

Of note, the Scoping Document approved by DDOT and provided in the Technical Attachments specified that the background growth rate would be obtained from the M Street SE/SW traffic study. However, a background growth rate is not available from this study due to the analysis methodology employed. The traffic volumes projected in the M Street study were calculated based on a macroscopic development model for 2035, based on the future land use in the study area. The analysis methodology used estimated the future traffic volumes based on an estimation of origins and destinations in the study area. The methodology employed in this analysis is based on a microscopic development model, which projects future traffic volumes based on approved background developments and inherent growth on the roadways.

The traffic volumes generated by the background development and the inherent growth were added to the existing traffic volumes in order to establish the future traffic volumes without the proposed development. The traffic volumes for the 2016 Background Conditions are shown on Figure 20 and Figure 21 for the morning and afternoon peak hours, the Saturday peak hour, and the “Game Day” scenario.



Figure 15: Direction of Approach for Background Developments

### **2016 Future Conditions with Phase 1 Development (2016 Future)**

Existing traffic volumes and travel patterns in the study area were analyzed and combined with the data obtained from the MWCOG for Southwest Waterfront in order to determine the trip distribution for the trips added by the proposed development, as shown in Figure 22. Based on this review and the proposed site access locations shown previously on Figure 9, the site-generated trips shown in Section 3.1 were distributed through the study area intersections, as shown on Figure 23 and Figure 24 for the morning and afternoon peak hours, the Saturday peak hour, and the “Game Day” scenario.

The traffic volumes for the 2016 Future conditions were calculated by adding the development-generated traffic volumes to the 2016 Background traffic volumes. Thus the future condition with the proposed development scenario includes traffic generated by: existing volumes, background development through the year 2016, inherent growth on the study area roadways, and Phase 1 of the proposed DC Water PUD. The 2016 Future traffic volumes are shown on Figure 25 and Figure 26 for the morning and afternoon peak hours, the Saturday peak hour, and the “Game Day” scenario.

### **2027 Future Conditions with Full Build-Out (2027 Future)**

Full build-out of the DC Water PUD is anticipated to be complete in 2027. The traffic projections for the future condition with the full build-out consist of the traffic generated by background developments with planned completion by 2027 from the list in the Section 1.7.2 of this report and inherent traffic growth on the roadways added to the existing traffic volumes, as well as the projected trips generated by the remaining portions of the PUD.

Of the developments listed in Section 1.7.2, only those that meet the criteria of being approved and having an origin/destination within the study area are included in the 2027 Future scenario. The following developments fit the criteria for inclusion in the 2027 Future scenario:

- Arthur Capper/Carrollsborg and Capitol Quarter (remaining parcels to be completed by 2027)
- The Yards at Southeast Federal Center (remaining parcels to be completed by 2027)
- Florida Rock/RiverFront on the Anacostia (remaining parcels to be completed by 2027)
- 1 M Street

As stated previously, available background development traffic studies were used to determine the number of trips added for the background developments. These documents were used to determine the number of trips generated by the aforementioned background developments, the mode split percentages, and the trip routing. Trip generation for the other background developments, as well as the trip generation for the Saturday peak hour when not included in the original study, was calculated based on the methodology outlined in the Institute of Transportation Engineers' (ITE) *Trip Generation*, 8<sup>th</sup> Edition, as outlined above.

Following the trip generation, these trips were distributed and assigned to the roadway network. As stated previously, where a background study was not available, trips generated by the background developments were distributed using an analysis based on Metropolitan Washington Council of Governments (MWCOG) transportation planning models. Figure 15, shown previously, shows the direction of approach for the background developments. Table 23 shows the total number of trips generated by the background developments. The trips generated for each background development are shown in the Technical Attachments.



**Table 22: Year 2016 Background Development Trip Generation**

Land Use	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
<b>Vehicle Trips</b>									
Retail	119	76	195	324	314	638	213	192	405
Residential	98	351	449	337	187	524	227	226	453
Office	687	94	781	127	617	744	115	97	212
Hotel	80	51	131	74	77	151	92	74	166
<b>Total Vehicle Trips</b>	<b>984</b>	<b>572</b>	<b>1,556</b>	<b>862</b>	<b>1,195</b>	<b>2,057</b>	<b>647</b>	<b>589</b>	<b>1,236</b>

**Table 23: Year 2027 Background Development Trip Generation**

Land Use	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
<b>Vehicle Trips</b>									
Retail	167	102	269	443	440	883	370	341	711
Residential	187	756	943	767	410	1,177	509	487	996
Office	2,248	308	2,556	410	2,007	2,417	412	355	767
Hotel	154	103	257	136	141	277	162	130	292
<b>Total Vehicle Trips</b>	<b>2,756</b>	<b>1,269</b>	<b>4,025</b>	<b>1,756</b>	<b>2,998</b>	<b>4,754</b>	<b>1,453</b>	<b>1,313</b>	<b>2,766</b>

In addition to the background developments, other traffic increased due to inherent growth on the study area roadways were accounted for with a 1.0% per year growth rate compounded annually over the study period (2016-2027). This rate was decreased from the 1.5% growth rate applied to the 2016 traffic volumes as it is unrealistic to assume linear growth on the study area roadways due to limited capacity. This growth rate was applied to all traffic volumes in the study area, with the exception of those traveling along South Capitol Street. As stated previously, a 0.25% per year growth rate, compounded annually over the study period, was applied to the South Capitol Street volumes in order to provide a conservative analysis.

Based on the trip distribution shown previously on Figure 22, the site-generated trips shown in Section 3.1 for full build-out were distributed through the study area intersections, as shown on Figure 27 and Figure 28 for the morning and afternoon peak hours, the Saturday peak hour, and the “Game Day” scenario.

The traffic volumes for the 2027 Future conditions were calculated by adding the traffic volumes generated by the background development and the inherent growth, as well as development-generated traffic volumes, to the 2016 Future traffic volumes. Thus the future condition with the proposed development scenario includes traffic generated by: existing volumes, background development through the year 2027, inherent growth on the study area roadways, and full build-out of the proposed DC Water PUD. The 2027 Future traffic volumes are shown on Figure 29 and Figure 30 for the morning and afternoon peak hours, the Saturday peak hour, and the “Game Day” scenario.

### *3.2.3 Geometry and Operations Assumptions*

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses, summarized in Table 24.

#### **Existing Conditions**

Gorove/Slade conducted field reconnaissance to confirm the existing lane configurations and traffic controls at the intersections within the study area, shown on Figure 31 and Figure 32. Of note, for the existing “Game Day” conditions, roadway closures are in effect adjacent to the Ballpark. This includes Half Street SE between M and N Streets SE and N Street between 1st and Van Streets SE. Existing signal timings and offsets were obtained from DDOT and confirmed during field reconnaissance.

#### **2016 Future Conditions without Development (2016 Background)**

The lane configurations for the 2016 future conditions without the proposed development are based on the existing lane configurations. While the M Street SE/SW Transportation Study, as outlined in Section 1.7.1, proposes several roadway and operational improvements in the study area, no roadway infrastructure changes were assumed for the future conditions without development for 2016. At the time of this analysis, no specific plans for implementation had not been developed. Even once specific improvement plans are made, no major roadway infrastructure changes will likely be implemented at the study area intersections by 2016. The lane configurations and traffic controls for the 2016 Background conditions are shown on Figure 31 and Figure 32.

#### **2016 Future Conditions with Phase 1 Development (2016 Future)**

The lane configurations for the 2016 future conditions with the proposed development are based on the lane configurations for the 2016 conditions without the proposed development. No roadway infrastructure or signal timing changes were assumed for the future conditions with development for 2016. However, the new internal site roadways and

site driveways, as described previously in Section 2.1.1 and as shown on Figure 9 were added to the roadway network. The lane configurations and traffic controls for the 2016 Future conditions are shown on Figure 33 and Figure 34

### **2027 Future Conditions with Full Build-Out (2027 Future)**

As stated previously, the entirety of the DC Water PUD is anticipated to be complete in 2027. The future conditions with full build-out include the reconstruction of South Capitol Street as described in Section 1.7.1. The following improvements were included in the 2027 Future scenario from the “Concept Plans” of the Preferred Alternative from the Final Environmental Impact Statement for the South Capitol Street Improvement project:

- Reconstruct the intersection of South Capitol Street and M Street to an at-grade intersection
  - Northbound and southbound approaches: two left-turn lanes, two through lanes, one shared through/right-turn lane
  - Eastbound and westbound approaches: one left turn lane, two through lanes, one shared through/right-turn lane
  - Assumed actuated and coordinated signal operation with a 120-second signal cycle (similar to existing signals along South Capitol Street in vicinity)
  - Optimized signal timing and intersection offset
- Reconstruct the intersection of South Capitol Street and Potomac Avenue to an oval connecting them with Q and R Streets
  - Reconstruct existing Frederick Douglass Memorial Bridge
    - Three lanes in each direction (inbound and outbound)
    - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic in the Oval
  - Westbound approach of Potomac Avenue
    - Two lanes entering the oval and two lanes exiting the oval to Potomac Avenue
    - Intersection controlled by a signal
    - Assumed to be actuated and coordinated signal operation with a 100-second signal cycle (standard for District intersections)
    - Optimized signal timing and intersection offset
  - Southbound South Capitol Street
    - Three lanes entering and exiting the Oval
    - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic in the Oval
  - Eastbound Q Street
    - One lane entering and exiting the Oval
    - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic entering the Oval from Q Street

- Eastbound Potomac Avenue
  - One-way outbound approach from the Oval
  - Two lanes exiting the Oval
- Eastbound R Street
  - One-way inbound approach towards the Oval
  - Two lanes entering the oval
  - Intersection assumed to be free-flowing for South Capitol Street with yield control for traffic entering the Oval from R Street

No other roadway infrastructure changes were assumed for the 2027 Future conditions. The lane configurations and traffic controls for the 2027 Future conditions are shown on Figure 35 and Figure 36.

**Table 24: Summary of Vehicular Capacity Analysis Assumptions**

<b>Existing Conditions</b>
<ul style="list-style-type: none"> <li>• Dates of data collection for morning and afternoon peak period analyses:                             <ul style="list-style-type: none"> <li>○ Thursday, March 21, 2013</li> <li>○ Tuesday, September 14, 2010;</li> <li>○ Wednesday, September 15, 2010;</li> <li>○ Wednesday, September 28, 2011; and</li> <li>○ Wednesday, March 28, 2012</li> <li>○ Counts taken from 6:30 – 9:30 AM and 4:00 – 7:00 PM</li> </ul> </li> <li>• Dates of data collection for Saturday peak period analysis:                             <ul style="list-style-type: none"> <li>○ Saturday, March 16, 2013; and</li> <li>○ Saturday, March 23, 2013.</li> <li>○ Counts taken from 5:00 – 9:00 PM</li> </ul> </li> <li>• Dates of data collection for “Game Day” analysis:                             <ul style="list-style-type: none"> <li>○ Tuesday, April 9; and</li> <li>○ Wednesday, April 10, 2013.</li> <li>○ Counts taken from 5:00 – 9:00 PM</li> </ul> </li> <li>• System peak for weekday morning and afternoon (including “Game Day”) periods: 7:45 – 8:45 AM, 4:30 – 5:30 PM</li> <li>• System peak for Saturday evening period: 5:15 – 6:15 PM</li> <li>• Count sheets included in Technical Attachments</li> <li>• Geometries and lane configurations based on existing conditions</li> <li>• Signal timings/phasings/offsets provided by DDOT</li> </ul>
<b>2016 Future Conditions without Development (2016 Background)</b>
<ul style="list-style-type: none"> <li>• Background developments:                             <ul style="list-style-type: none"> <li>○ Developments assumed completed by 2016 listed in Section 1.7.2</li> <li>○ Mode split &amp; assignment assumptions taken from individual transportation studies for each development, where possible. If no study was on record, mode split assumptions shown in Table 21 and assignment methodologies were similar to those used for the site, based on trip distribution shown in Figure 15.</li> </ul> </li> <li>• Background growth percentage:                             <ul style="list-style-type: none"> <li>○ 0.25% per year applied to South Capitol Street</li> <li>○ 1.5% per year applied to all other roadways</li> </ul> </li> <li>• No roadway infrastructure improvements assumed.</li> </ul>
<b>2016 Future Conditions with Phase 1 Development (2016 Future)</b>
<ul style="list-style-type: none"> <li>• Site trip generation and mode split assumptions are detailed in Section 3.1 of report</li> <li>• Trip distribution for vehicles based on existing traffic volumes and travel patterns in the study area, along with MWCOG model origin/destination data, as shown on Figure 22</li> <li>• No signal timing changes assumed</li> <li>• Included addition of internal roadways and site driveways as shown on Figure 9.</li> </ul>

**2027 Future Conditions with Full Build-Out (2027 Future)**

- Background developments:
  - Developments assumed completed by 2027 listed in Section 1.7.2
  - Mode split & assignment assumptions taken from individual transportation studies for each development, where possible. If no study was on record, mode split assumptions shown in Table 21 and assignment methodologies were similar to those used for the site, based on trip distribution shown in Figure 15.
- Background growth percentage:
  - 0.25% per year applied to South Capitol Street
  - 1.0% per year applied to all other roadways
- Site trip generation and mode split assumptions are detailed in Section 3.1 of report
- Trip distribution for vehicles based on existing traffic volumes and travel patterns in the study area, along with MWCOG model origin/destination data, as shown on Figure 22
- Roadway infrastructure improvements assumed from South Capitol Street FEIS
  - Convert South Capitol Street and M Street to signalized at-grade intersection
  - Convert intersection of South Capitol Street and Potomac Avenue to Oval, with Q and R Streets
- Included addition of internal roadways and site driveways as shown on Figure 9.

**3.2.4 Vehicular Analysis Results**

Intersection capacity analyses were performed for the four scenarios outlined in Section 3.2.1 at the intersections contained within the study area during the morning and afternoon peak hours, Saturday peak hour, and “Game Day” scenario. *Synchro, Version 7.0* was used to analyze the study intersections based on the Highway Capacity Manual (HCM) 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 E is typically assumed as the acceptable LOS threshold in the District; although LOS F is sometimes accepted in urbanized areas.

The LOS capacity analyses were based on: (1) the peak hour traffic volumes outlined in Section 3.2.2; (2) the lane use and traffic controls outlined in Section 3.2.3; and (3) the Highway Capacity Manual (HCM) methodologies (using *Synchro 7* software). The average delay of each approach and LOS is shown for the signalized intersections in addition to the overall average delay and intersection LOS grade. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay. Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments. Table 25 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds) for the Existing, 2016 Background, and 2016 Future scenarios. Table 26 shows the capacity analysis results for 2027 Future 2027 Future scenarios. The capacity analysis results for the morning peak hour are shown on Figure 37 and Figure 38, and for the afternoon peak hour are shown on Figure 39 and Figure 40. Capacity analysis results for the Saturday peak hour are shown on Figure 41 and Figure 42, and the results for the “Game Day” scenario are shown on Figure 43 and Figure 44.

**3.2.5 Summary of Analysis Results and Mitigation Measures**

Generally speaking, the proposed development is considered to have an impact at an intersection within the study area if the capacity analyses show an LOS F at an intersection or along an approach in the future conditions with the proposed development where one does not exist in the future conditions without the proposed development.

The majority of study intersections operate at acceptable conditions during the morning and afternoon peak hours for the Existing and 2016 Background and Future scenarios. However, the following intersections operate under unacceptable conditions during one or more peak hour:

- South Capitol Street and I Street
- South Capitol Street (Ramp) and N Street
- South Capitol Street and Potomac Avenue
- M Street and 5<sup>th</sup> Street

Additionally, the majority of the study intersections operate under acceptable conditions during the morning and afternoon peak hours for the 2027 Future scenario. However, in addition to those listed previously, the following intersections are projected to operate under unacceptable conditions during one or more peak hour:

- South Capitol Street and M Street
- South Capitol Street and South Capitol Street Oval
- M Street and 1<sup>st</sup> Street
- N Street and New Jersey Avenue
- M Street and 4<sup>th</sup> Street

Table 27 summarizes the results of the capacity analyses including discussion of what is generating the delays and potential mitigation. Recommendations for improvements at intersections with LOS F conditions are shown underlined. All improvements associated with the proposed DC Water PUD are shown as **bold underline**. Table 28 and Table 29 shows the capacity analysis results with the improvements shown in Table 27.