

**SQUARE 54  
TRANSPORTATION IMPACT STUDY  
WASHINGTON, D.C.**

Prepared for:  
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## **Section I INTRODUCTION**

This report presents the results of a transportation impact analysis of Square 54, which is located on The George Washington University Foggy Bottom campus, as shown on Figure I-1. It is bordered by the Washington Circle and Pennsylvania Avenue on the north, Eye Street on the south, 22<sup>nd</sup> Street on the east, and 23<sup>rd</sup> Street on the west. The Foggy Bottom-GWU Metro station is located adjacent to Square 54, in the northwest quadrant of the Eye Street/23<sup>rd</sup> Street intersection.

The George Washington University Hospital was formerly located on Square 54. The old hospital building was razed and the new hospital was built on the west side of 23<sup>rd</sup> Street. Square 54 presently is vacant, ready for re-development.

Boston Properties, Inc., KSI Services, Inc, and The George Washington University propose to re-develop Square 54 with a mix of office, residential, and retail uses. The preliminary development program includes approximately 454,000 gross square feet (GSF) of office space, 333 residential units, 84,000 GSF of above and below grade retail space, including a contemplated grocery store of up to 45,000 GSF.

These proposed uses will be served by approximately 1,026 parking spaces on five underground levels. As set forth in the recently-filed Foggy Bottom Campus Plan: 2006-2025, approximately 362 additional spaces will be provided for use by The George Washington University (GWU). These spaces will replace existing spaces that will be displaced by future development on the GWU campus.

For purposes of this traffic analysis, this development was assumed to be completely built and occupied by 2010.

Tasks undertaken in this study included the following:

1. Review Boston Properties, Inc. and KSI Services, Inc.'s proposed development program, plans prepared by Pelli Clarke Pelli, and other background data.
2. A field reconnaissance of existing street and intersection geometrics, traffic controls, traffic signal phasing/timings, and speed limits.
3. Counts of existing traffic at six (6) key intersections including Washington Circle.

4. Analysis of existing levels of service at these intersections.
5. Background future traffic volumes were forecasted for project buildout.
6. Background levels of service were calculated at key intersections based on background traffic forecasts, existing traffic controls, and existing intersection geometrics.
7. The number of AM and PM peak hour vehicle-trips that would be generated by the proposed project were estimated based on: (1) Institute of Transportation Engineers (ITE) vehicle-trip generation rates, (2) the proximity of the project to the Foggy Bottom-GWU Metro station, and (3) experience with other comparable projects in Washington, D.C.
8. Total future traffic volumes were forecasted for 2010.
9. Total future levels of service were calculated at key intersections based on total future traffic forecasts, existing traffic controls, and existing intersection geometrics.
10. Operational improvements required to adequately accommodate site traffic were identified.

Sources of data for this analysis included traffic counts conducted by Wells & Associates, ITE, the Washington Metropolitan Area Transit Authority (WMATA), the District of Columbia Office of Planning, the District Department of Transportation (DDOT), The George Washington University, the U.S. Census Bureau, Pelli Clarke Pelli, Boston Properties, Inc., and KSI Services, Inc.

***The conclusions of this study are as follows:***

1. ***The majority of the key intersections in the study area presently operate at an overall acceptable level of service (LOS) "D" or better during the AM and PM peak hours.***

***The approved and/or proposed but unbuilt projects in the study area will generate a total of 476 AM peak hour vehicle-trips and 592 PM peak hour vehicle-trips, upon completion and full occupancy.***

**Square 54 will add another 396 AM peak hour vehicle-trips and 627 PM peak hour vehicle-trips, to the public street system upon project completion and full occupancy.**

- 2. The eastbound right turn movement, which operates under yield control, at the Washington Circle/K Street intersection currently operates at a LOS "F" during the AM peak hour.**

**The westbound approach at the 23<sup>rd</sup> Street/Eye Street intersection currently operates at capacity at a LOS "F" during the PM peak hour due to the high volume of westbound traffic turning left onto 23<sup>rd</sup> Street.**

**The westbound movement at the 22<sup>nd</sup> Street/Pennsylvania Avenue intersection presently operates at capacity at LOS "F" during the PM peak hour due to the high volume of through traffic traveling towards Washington Circle.**

**Finally, the southbound approach at the 24<sup>th</sup> and K Street (westbound) intersection currently operates at a LOS "E" during the PM peak hour.**

- 3. These additional background vehicle-trips would not significantly affect the existing intersection delays or levels of service described above, except at the 22<sup>nd</sup> Street/Pennsylvania Avenue and 23<sup>rd</sup> Street/Eye Street intersections, where the overall level of service would drop to a LOS "E" and at the intersection of 24<sup>th</sup> Street and K Street (westbound), where the southbound approach would operate at a LOS "F" during the PM peak hour.**
- 4. Most of the key intersections in the study area would continue to operate at overall acceptable LOS "D" or better during the AM and PM peak hours, with these additional site-generated vehicle-trips, except at the intersections discussed previously in the existing and background future levels of service sections.**

**The eastbound yield controlled right turn movement at the intersection of Washington Circle/K Street (eastbound) and the southbound movement at the intersection of 23<sup>rd</sup> Street/Eye Street will operate at a LOS "E" during the PM peak hour.**



- 5. A new traffic signal and a separate eastbound left turn lane are recommended to be constructed at the intersection of 22<sup>nd</sup> and Eye Streets to accommodate the high volume of traffic turning left onto northbound 22<sup>nd</sup> Street.***

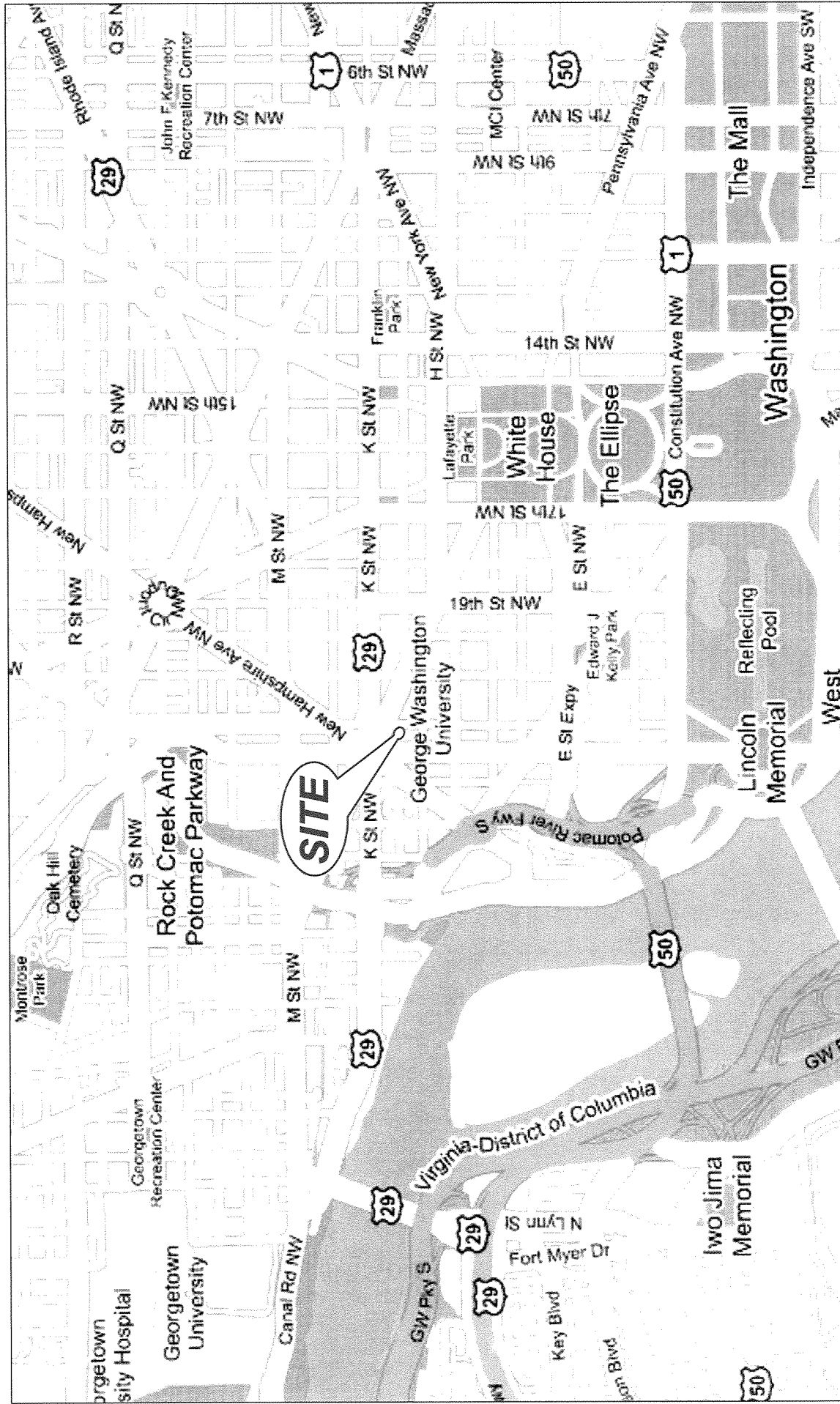


Figure 1-1  
Site Location

## Section 2 BACKGROUND DATA

### Overview

This section presents background data, including the study scope, description of the public street system, description of the proposed Square 54 vehicular access concept, existing vehicular and pedestrian traffic counts, curb parking inventory, existing public transportation facilities and services, pedestrian facilities, bicycle facilities, and U.S. Census data.

### Study Scope

This traffic study includes the following intersections:

- I. Washington Circle:
  - a. Circle/23<sup>rd</sup> Street (South),
  - b. Circle/New Hampshire Avenue (Southwest),
  - c. Circle/K Street Frontage Roads (West),
  - d. Circle/Pennsylvania Avenue (Northwest),
  - e. Circle/23<sup>rd</sup> Street (North),
  - f. Circle/New Hampshire Avenue (Northeast),
  - g. Circle/K Street Frontage Roads (East), and
  - h. Circle/Pennsylvania Avenue (Southeast).
2. 23<sup>rd</sup> Street/Eye Street,
3. 23<sup>rd</sup> Street/Virginia Avenue/F Street,
4. 22<sup>nd</sup> Street/K Street,
5. 22<sup>nd</sup> Street/Pennsylvania Avenue,
6. 22<sup>nd</sup> Street/Eye Street, and
7. 22<sup>nd</sup> Street/Virginia Avenue.
8. 24<sup>th</sup> Street/K Street, and
9. 23<sup>rd</sup> Street/H Street.

This study also includes the following approved and proposed development projects:

- I. **IMF 2 Headquarters.** The existing PEPCO office building (420,000 S.F.) was expanded to 649,350 S.F. This development is located in the vicinity of 20<sup>th</sup> and H Streets, and was completed in fall 2005.

2. **Columbia House Apartments I and II.** Columbia House Apartments I and II will be developed with 142 and 213 residential units, respectively. Both residential buildings will be located on M Street, between 24<sup>th</sup> and 25<sup>th</sup> Streets.
3. **2425 L Street, N.W.** This building will contain 200 condominiums on the site of the former Columbia Hospital for Women, which is bounded by 24<sup>th</sup> Street on the east, 25<sup>th</sup> Street on the west, and L Street on the south.
4. **United States Institute of Peace (USIP).** The new USIP headquarters will be located in the northwest quadrant of the 23<sup>rd</sup> Street/Constitution Avenue intersection and will contain a total of 248,000 square feet (S.F.) (128,000 S.F. of workspace for Institute staff and research fellows (including a 250-seat auditorium), 20,000 S.F. Public Education Center, and 100,000 S.F. for a below-grade garage.)
5. **Allstate Hotel Partnership.** Allstate Hotel Partnership proposes to raze an existing six-story parking garage and develop a nine-story, 147-room hotel on Lot 25 in Square 122 of Northwest Washington, DC. The property, 515 20<sup>th</sup> Street, N.W., is located on the east side of 20<sup>th</sup> Street, between E and F Streets, in the northwest section of Washington, DC.
6. **George Washington (GW) Foggy Bottom Campus Plan: 2006-2025.** The new Campus Plan accommodates the addition of approximately 2,000,000 gross square feet (GSF) of space for university use, including classrooms, labs, residential space, offices, support space, and other University facilities.
7. **DCPS/GW/School Without Walls PUD.** This joint development partnership consists of two projects. The GW component is a new apartment style undergraduate residence to be located between 2125 and 2135 F Street, with access to a below grade parking garage and internal loading dock directly off F Street. The residence hall will contain approximately 474 undergraduate beds and 178 parking spaces. The second component is the addition to the existing School Without Walls structure which includes classrooms, laboratories, and a common area.

The impacts of these approved and proposed projects and the subject project were evaluated at project buildout, which is anticipated to occur in 2010.

Level of service (LOS) “D” is considered the minimum acceptable level of service in urban areas such as Washington, D.C. LOS “E” generally is considered acceptable for short periods of time in built-up areas such as downtown Washington, D.C.

### **Public Street Network**

Square 54 is served by a connected network of arterial, collector, and local streets. Pennsylvania Avenue, Washington Circle, 23<sup>rd</sup> Street, K Street, and Eye Street are classified by DDOT as principal arterial streets. New Hampshire Avenue north of Washington Circle, Virginia Avenue and 19<sup>th</sup> and 20<sup>th</sup> Streets are classified as minor arterial streets. F, G, H, 21<sup>st</sup>, 22<sup>nd</sup>, and 24<sup>th</sup> Streets are classified as collector streets. Existing intersection lane use and traffic control at key intersections in the site vicinity are shown on Figure 2-1.

**Washington Circle.** K Street, 23<sup>rd</sup> Street, Pennsylvania Avenue, and New Hampshire Avenue converge at Washington Circle. The mainline of K Street passes beneath the Circle. Frontage roads on both sides of K Street intersect the Circle at grade. All streets except the K Street frontage roads intersect the Circle at signalized junctions. This is a two- to four-lane circle with a posted speed limit of 25 miles per hour (mph). No parking is permitted within the Circle. Metrobus lines 30, 32, 34, 35, 36, 38B, H1, L1, N3, and D5 provide service along Washington Circle.

**23<sup>rd</sup> Street.** This principal arterial is one of the most vibrant streets in Washington, D.C. Automobile, public buses, private shuttle buses, pedestrians, bicyclist, and cars parked along the curb share this five-lane street. The Foggy Bottom-GWU Metro station, The George Washington University, and the George Washington University Hospital generate large numbers of pedestrians that use the sidewalks and crosswalks on 23<sup>rd</sup> Street, particularly at Eye Street.

Three lanes are provided in the northbound direction and two lanes are provided in the southbound direction. The posted speed limit is 25 mph. The intersections of Eye and H Streets are controlled by a traffic signal. Metrobus lines H1, L1, and N3 provided service along 23<sup>rd</sup> Street to Washington Circle.

**22<sup>nd</sup> Street.** This is a two-lane northbound (one-way) street in the vicinity of Eye Street, and increases to a three-lane northbound (one-way) street in the vicinity of Pennsylvania Avenue. The posted speed limit is 35 mph. The 22<sup>nd</sup> Street/Eye Street intersection is controlled by all-way stop signs. The intersections of 22<sup>nd</sup> Street with Pennsylvania Avenue and K Street (eastbound and westbound) are controlled by traffic signals.

**Eye Street.** This is a two-lane street with a posted speed limit of 25 mph. The Eye Street/23<sup>rd</sup> Street intersection is controlled by a traffic signal and the Eye Street/22<sup>nd</sup> Street intersection is controlled by a stop sign. Eye Street, between 23<sup>rd</sup> and 24<sup>th</sup> Streets, is a pedestrian mall, closed to vehicular traffic. Metrobus lines H1, L1, and N3 provide service in the vicinity of the intersection of Eye Street and 23<sup>rd</sup> Street.

**Pennsylvania Avenue.** This is a four-lane street with a posted speed limit of 25 mph. Pennsylvania Avenue (northwest bound) allows two lanes to merge onto Washington Circle, and two lanes to merge back onto Pennsylvania Avenue. Pennsylvania Avenue (southeast bound) allows three lanes to merge onto Washington Circle, and two lanes to merge back onto Pennsylvania Avenue. Metrobus lines 30, 32, 34, 35, 36, and 38B provide service along Pennsylvania Avenue.

### **Vehicular Access Concept**

Square 54 fronts on Washington Circle, Eye Street, 22<sup>nd</sup> Street, and 23<sup>rd</sup> Street. Before the old George Washington University Hospital was razed, the site was served by nine (9) driveways: three (3) on Washington Circle, three (3) on Eye Street, one (1) on 22<sup>nd</sup> Street, and two (2) on 23<sup>rd</sup> Street. All vehicular access to the proposed Square 54 underground parking garage and the loading docks would be consolidated at two adjacent driveways on 22<sup>nd</sup> Street near the center of the block. No driveways are proposed on Washington Circle, Eye Street, or 23<sup>rd</sup> Street.

### **Existing Traffic Counts**

**Intersection Vehicular Traffic Counts.** Existing AM and PM peak period vehicular and pedestrian traffic counts were conducted on Wednesday, May 11, 2005, by Wells & Associates at the following intersections:

- #1. Washington Circle:
  - a. Circle/23<sup>rd</sup> Street (South),
  - b. Circle/New Hampshire Avenue (Southwest),
  - c. Circle/K Street Frontage Roads (West),
  - d. Circle/Pennsylvania Avenue (Northwest),
  - e. Circle/23<sup>rd</sup> Street (North),
  - f. Circle/New Hampshire Avenue (Northeast),
  - g. Circle/K Street Frontage Roads (East), and
  - h. Circle/Pennsylvania Avenue (Southeast).
- #2. 23<sup>rd</sup> Street/Eye Street,
- #3. 23<sup>rd</sup> Street/Virginia Avenue,

- #6. 22<sup>nd</sup> Street/Eye Street, and
- #7. 22<sup>nd</sup> Street/Virginia Avenue.

Additional AM and PM peak period vehicular and pedestrian traffic counts were conducted on Tuesday, July 12, 2005, by Wells & Associates at the 23<sup>rd</sup> Street/Virginia Avenue/F Street intersection. Copies of the counts are included in Appendix A.

Additional peak hour turning movement counts were obtained from the Square 37 Traffic Impact Study<sup>1</sup> at the following intersections:

- #4. 22<sup>nd</sup> Street/K Street,
- #5. 22<sup>nd</sup> Street/Pennsylvania Avenue,
- #8. 24<sup>th</sup> Street/K Street and
- #9. 23<sup>rd</sup> Street/H Street.

The common peak hours for the study intersections occurred from 8:00 AM to 9:00 AM and from 5:15 PM to 6:15 PM. Existing traffic volumes from Wells & Associates' counts and the Square 37 study were adjusted to balance between study intersections with some allowance for driveways or roadways located between study intersections. Baseline peak hour traffic volumes are shown on Figure 2-2.

Figure 2-2 indicates that 23<sup>rd</sup> Street, south of Washington Circle, presently carries 1,096 vehicle-trips during the AM peak hour and 1,467 vehicle-trips during the PM peak hour. Approximately 55-percent of the traffic travels northbound along 23<sup>rd</sup> Street during the AM peak hour; approximately 68 percent of the traffic travels southbound along 23<sup>rd</sup> Street during the PM peak hour.

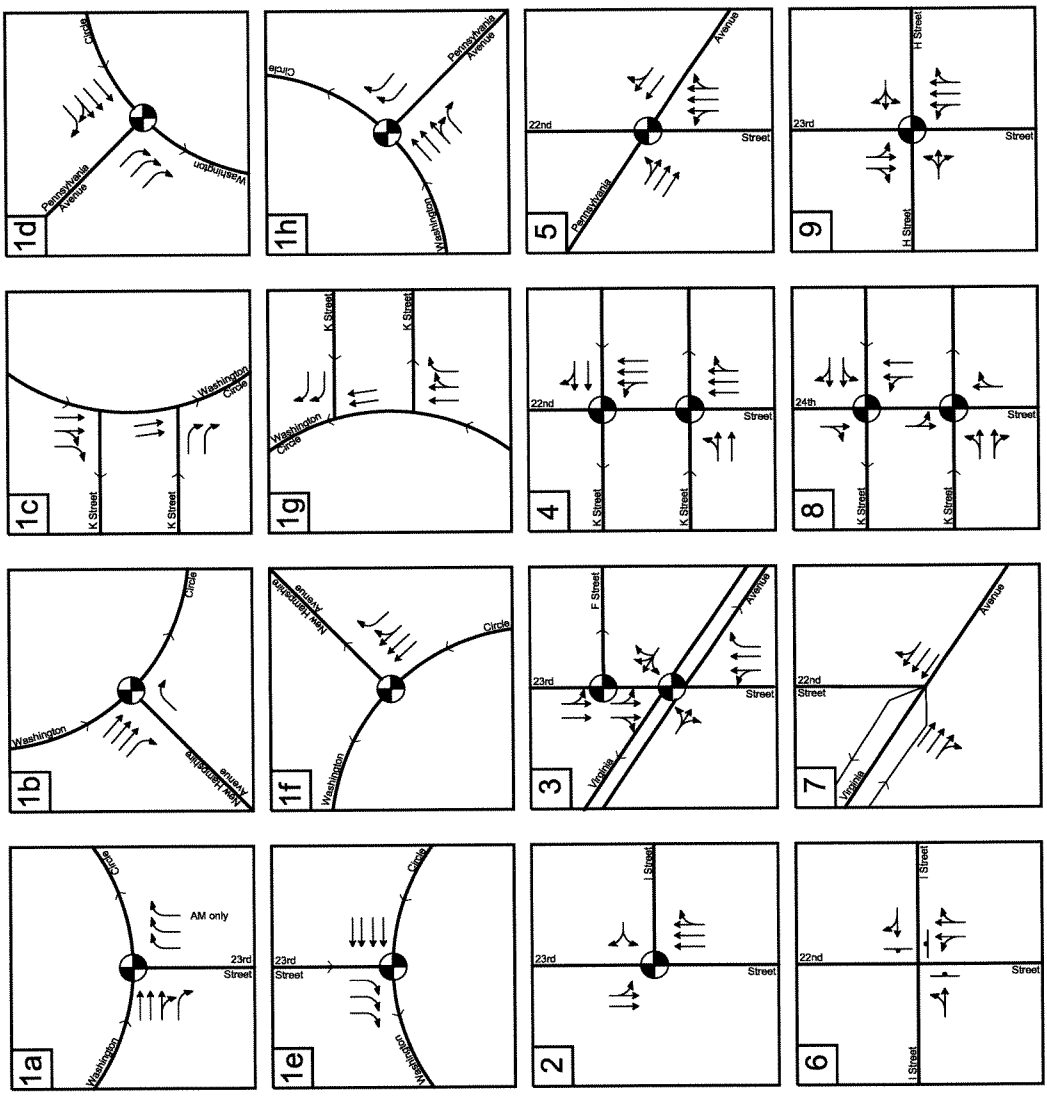
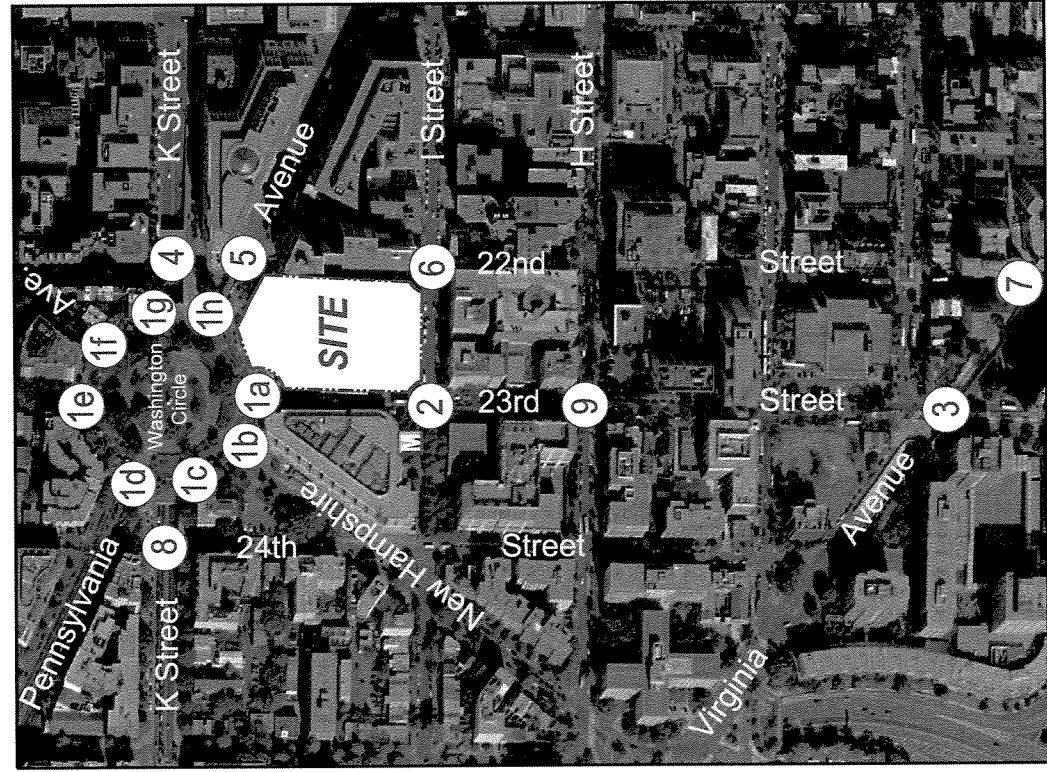
22<sup>nd</sup> Street, south of Pennsylvania Avenue, carries 639 vehicle-trips during the AM peak hour and 382 vehicle-trips during the PM peak hour.

Eye Street, between 22<sup>nd</sup> and 23<sup>rd</sup> Streets, carries 404 vehicle-trips during the AM peak hour and 382 vehicle-trips during the PM peak hour. Approximately 81 percent of the traffic travels eastbound along Eye Street during the AM peak hour; approximately 71 percent of the traffic travels westbound along Eye Street during the PM peak hour.

**Link Vehicular Traffic Counts.** Average daily traffic (ADT) counts for 2000 were obtained from DDOT, as shown in Table 2-1. The most heavily traveled streets in the study area are K Street, Pennsylvania Avenue, 23<sup>rd</sup> Street, and Virginia Avenue.

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<sup>1</sup> Traffic Services Administration, District Department of Transportation, Square 37 Rezoning Traffic Impact Study, September, 2002.

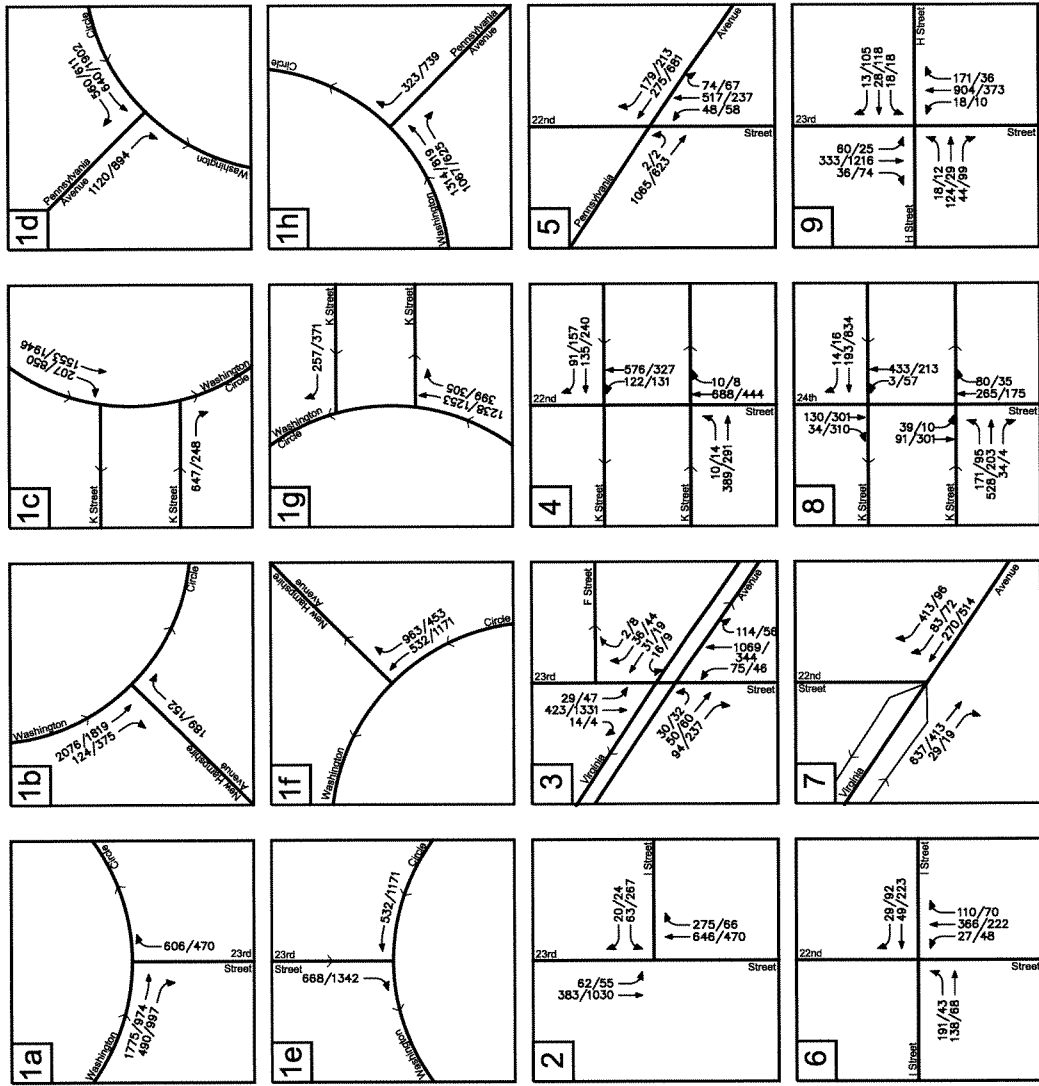
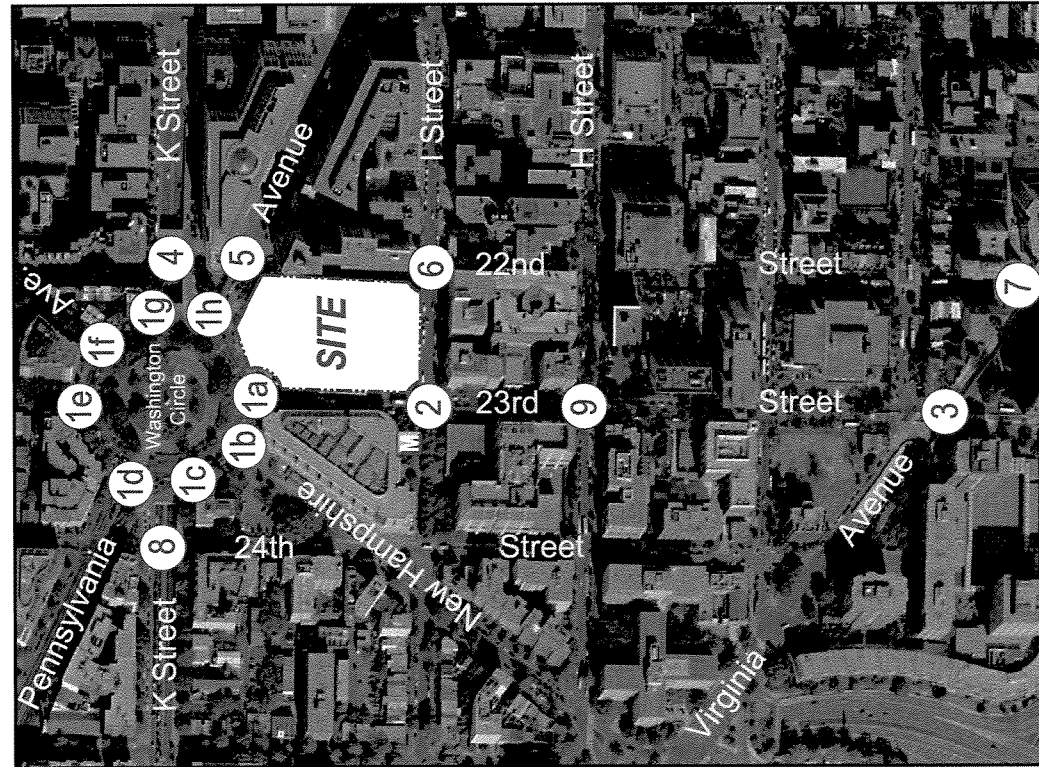


← Represents One Travel Lane  
 ● Signalized Interaction  
 — Stop Sign



Figure 2-1  
 Intersection Lane Use And Traffic Control





North  
Schematic  
All Peak Hour  
000/000

Figure 2-2  
Existing Peak Hour Vehicular Traffic Counts

Table 2-1  
2002 Link Traffic Counts <sup>1</sup>

Location	At	2002 Average Daily Traffic
23rd Street (north)	Washington Circle	13,300
23rd Street (south)	Washington Circle	18,000
Pennsylvania Avenue	East of Washington Circle	23,200
Pennsylvania Avenue	West of Washington Circle	23,500
K Street (eastbound)	Washington Circle	30,000
K Street (westbound)	Washington Circle	32,000
New Hampshire Avenue	East of Washington Circle	6,000
New Hampshire Avenue	West of Washington Circle	4,900
22nd Street	K Street (eastbound) and Pennsylvania Avenue	13,500
22nd Street	I Street	5,900
23rd Street	H Street	17,600
Virginia Avenue	West of 23rd Street	12,800
Virginia Avenue	East of 22nd Street	13,400

<sup>1</sup> Information taken from the District Department of Transportation Traffic Volume Maps

**Pedestrian Traffic Counts.** Existing AM and PM peak hour pedestrian traffic counts are presented in Appendix B and summarized on Figure 2-3.

Very large numbers of pedestrians cross 23<sup>rd</sup> and Eye Streets during peak hours. Approximately 2,900 to 3,100 pedestrians cross the three legs of the 23<sup>rd</sup> Street/Eye Street intersection during the AM and PM peak commuter hours and 1,300 to 1,500 pedestrians cross the four legs of the 22<sup>nd</sup> Street/Eye Street intersection during peak hours.

Approximately 350 to 500 pedestrians cross 23<sup>rd</sup> Street south of Washington Circle, and only 85 to 125 pedestrians cross the four legs of the Pennsylvania Avenue/22<sup>nd</sup> Street intersection during peak hours.

### **Curb Parking**

Curb parking is permitted on most streets in the study area. Daytime curb parking regulations in the immediate site vicinity is shown on Figure 2-4. A total of 32 short-term parking meters are located along the site frontage on 22<sup>nd</sup>, Eye, and 23<sup>rd</sup> Streets. (Meters were missing at two parking spaces on both 22<sup>nd</sup> and 23<sup>rd</sup> Streets at the time this data was collected). No parking is permitted in Washington Circle, except in the vicinity of 23<sup>rd</sup> Street (north) where 2-hour parking is permitted. No parking is permitted on the west side of 23<sup>rd</sup> Street, between the Circle and Eye Street; however, shuttle buses, police cars, and other official vehicles typically park here for short periods of times.

### **Public Transportation Facilities and Services**

**Overview.** Square 54 is served by the Foggy Bottom-GWU Metrorail Station and six (6) Metrobus lines, as shown on Figure 2-5. The Foggy Bottom-GWU Metro station also is served by the Kennedy Center and other private shuttle bus lines.

**Metrorail.** The Foggy Bottom-GWU Metro Station is located across 23<sup>rd</sup> Street from Square 54, in the northwest quadrant of the 23<sup>rd</sup> Street/Eye Street intersection. This station was used by nearly 41,000 passengers on an average weekday in 2002, according to the WMATA passenger surveys that are summarized in Table 2-2. About half of all passengers using this station alight from trains in the AM peak period and board in the PM peak period.

Table 2-2  
Foggy Bottom-GWU Metro Station Passenger Boardings and Alightings

<u>Time Period</u>	<u>Boardings</u>	<u>Alightings</u>	<u>Total</u>
AM Peak	2,007	9,326	11,333
AM Off Peak	4,219	5,278	9,497
PM Peak	10,725	3,440	14,165
PM Off Peak	<u>4,906</u>	<u>1,021</u>	<u>5,927</u>
Total	21,857	19,065	40,922

A large majority of passengers (85 to 87 percent) walk to and from the station; very few drive or are driven to the station, as shown in Table 2-3.

Table 2-3  
Foggy Bottom-GWU Metro Station Passenger Ingress and Egress Modes

<u>Mode</u>	<u>Ingress</u>		<u>Egress</u>	
	<u>Number</u>	<u>Percent</u>	<u>Number</u>	<u>Percent</u>
Metrobus	761	3.5%	533	2.8%
Other Bus	1,271	5.8%	1,120	5.9%
Park and Ride	360	1.6%	216	1.1%
Rode with Another	19	0.1%	24	0.1%
Kiss and Ride	362	1.7%	145	0.8%
Bike	13	0.1%	5	0.0%
Walk	18,673	85.4%	16,666	87.4%
Taxi	57	0.3%	43	0.2%
<u>Unknown</u>	<u>339</u>	<u>1.6%</u>	<u>313</u>	<u>1.6%</u>
Total	21,855	100.0%	19,065	100.0%

About two-thirds of all passengers using the Foggy Bottom-GWU Metro station were traveling for the purpose of work or job-related business, as shown in Table 2-4. School trips accounted for less than 10 percent of all trips.

Table 2-4  
Foggy Bottom-GWU Metro Station Egress Trip Purpose

<u>Trip Purpose</u>	<u>Number Of Passengers</u>	<u>Percent</u>
Work	11,441	60.0%
Job-Related Business	944	5.0%
Shopping or Meal	726	3.8%
School	1,870	9.8%
Personal Trip	2,541	13.3%
Sightseeing or Recreation	957	5.0%
<u>Unknown</u>	<u>586</u>	<u>3.1%</u>
Total	19,065	100.0%

**Metrobus.** Six (6) Metrobus lines operate on adjacent or nearby streets, as shown on Figure 2-5. A total of 790 bus-trips are operated on these lines on a typical weekday, 259 bus-trips on a typical Saturday, and 165 bus-trips on a typical Sunday, as shown in Table 2-5.

Table 2-5  
Metrobus Service in Vicinity of Square 54

<u>Line</u>	<u>Name</u>	<u>Daily Bus-Trips</u>		
		<u>Weekday</u>	<u>Saturday</u>	<u>Sunday</u>
30, 32, 34, 35, 36	Pennsylvania Avenue	320	N/A	N/A
38B	Ballston-Farragut Square	93	73	36
D5	MacArthur Blvd-Georgetown	13	N/A	N/A
H1	Brookland-Potomac Park	15	N/A	N/A
L1, L2, L4	Connecticut Avenue	177	102	70
<u>N2, N3, N4, N6</u>	Massachusetts Avenue	<u>172</u>	<u>84</u>	<u>59</u>
Total		790	259	165

### **Pedestrian Facilities**

Pedestrian access to Square 54 would be provided via a sidewalk system that exists on both sides of the streets in the immediate vicinity of the subject site. The sidewalks facilitate access to the site and to the Foggy Bottom-GWU Metro station, which is located adjacent to Square 54. Pedestrian signals with clearly marked crosswalks are located at all major intersection surrounding Square 54 and along Washington Circle.