

Traffic Impact Study

Michigan Avenue at Irving St Mixed Use - Planned Unit Development Washington, D.C.

December, 2008

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EXECUTIVE SUMMARY

This report presents the results of a traffic impact analysis performed for the planned development of a site located within the northwest quadrant of the Michigan Avenue at Irving Street intersection, in Northeast Washington, D.C. The site is currently unzoned and serves as a 400-space fringe parking lot for the Washington Hospital Center.

The Applicant, Conference Center Associates I, plans to redevelop the 5.5-acre site in two phases under the C-3-A (medium bulk business and employment center) zoning district. Phase I of the development includes a 314-room hotel (including a 30,000 SF conference center), 18,000 SF of retail and a 5,000 SF restaurant. This phase would also include a 301-space parking garage and 280 surface parking spaces for continued use by the Washington Hospital Center. Phase II includes the addition of two buildings with two build-out options. Option 1 calls for the elimination of the 280 surface parking spaces and the development of 240 residential units supported by a 220-space below grade parking garage. Option 2 proposes 120 residential apartment units and a 200-room hotel. This option would include the 220-space underground garage and a 174-space addition to the Phase I garage. Current plans call for the Phase I development to be built-out by 2011 and Phase II by 2016. Vehicular access will be provided via entrances off both Michigan Avenue and Irving Street.

The key findings and conclusions of this traffic impact study are as follows:

- 1) Under Existing Traffic Conditions, the study area intersections operate at acceptable Levels of Service (i.e., without excessive capacity and delay conditions) during both the morning and afternoon peak hours. The Irving Street site access operates at capacity during the afternoon peak hour.
- 2) Under Future (2016) Background Traffic Conditions (i.e., without the proposed development), the majority of the study area intersections would operate at capacity, primarily due to projected heavy commuter peak hour traffic volumes along the major roadways (Michigan Avenue, Irving Street and North Capitol Street). These traffic projections were based on the application of an annual growth rate (1.0%) to existing through/regional traffic until 2016, and consideration of several significant background developments planned for the study area. Review of DDOT Average Annual Daily Traffic (AADT) Maps indicate that traffic volumes have either remained stable, increased marginally or declined over the period 2001 - 2006. This study also notes that the background developments have been the subject of various planning and design considerations over the last 10± years, and their land use programs and build-out timeframes are still uncertain at this time. The Irving Street site access would also operate with capacity constraints.



- 3) Under Total Future (2016) Traffic Conditions (including full-build-out of the proposed development), the majority of the study area intersections would operate at capacity, primarily due to projected heavy commuter peak hour traffic volumes along the major roadways (Michigan Avenue and North Capitol Street). The proposed development would generate 245 and 234 additional/new trips during the morning and afternoon peak hours, respectively, compared to the existing site trip generation. These trips would increase the study area intersection traffic volumes by approximately 1.5% during the AM and PM peak hours. It is also noted that the additional site trips would not degrade intersection levels of service or significantly increase average delay beyond what would occur in the future without the development. Therefore, the development in and of itself would have minimal impacts on the study area roadway network.
- 4) The Irving Street site access would operate at capacity under the projected future traffic conditions. The Applicant plans to install a traffic signal and provide geometric improvements to address the projected capacity deficiency.
- 5) The proposed development would be provided with adequate off-street parking and loading facilities in both development phases. These provisions will satisfy the requirements of the District of Columbia Municipal Regulations.

Based on the above, this study concludes that the proposed development could be approved as planned, without having any significant adverse impacts on the surrounding road network and adjacent communities.



INTRODUCTION

This report presents the results of a traffic impact analysis performed for the planned development of a site located within the northwest quadrant of the Michigan Avenue at Irving Street intersection, in Northeast Washington, D.C. The site is unzoned and serves as a 400-space fringe parking lot for the Washington Hospital Center (MedStar Health). The location of the site is shown in Figure 1.

The Applicant, Conference Center Associates I, plans to redevelop the 5.5-acre site in two phases under the C-3-A (medium bulk business and employment center) zoning district. Phase I of the development includes a 314-room hotel (including a 30,000 SF conference center), 18,000 SF of retail and a 5,000 SF restaurant. This phase would also include a 301-space parking garage and 280 surface parking spaces for continued use by the Washington Hospital Center. Phase II includes the addition of two buildings with two build-out options. Option 1 calls for the elimination of the 280 surface parking spaces and the development of 240 residential units supported by a 220-space below grade parking garage. Option 2 proposes 120 residential apartment units and a 200-room hotel. This option would include the 220-space underground garage and a 174-space addition to the Phase I garage. Current plans call for the Phase I development to be built-out by 2011 and Phase II by 2016. Vehicular access will be provided via entrances off both Michigan Avenue and Irving Street.

The primary purpose of this study is to evaluate the local traffic impacts of the proposed redevelopment, and to identify transportation improvements needed to mitigate any identified potential impacts. Gorove/Slade Associates undertook the following key tasks while preparing this study:

- Conducted field reconnaissance of existing roadway and intersection geometrics, traffic controls, speed limits and operations;
- Held discussions and corresponded with District Department of Transportation (DDOT) staff regarding the study scope and methodology;
- Performed morning and afternoon peak period turning movement counts at the study intersections;
- Determined the existing levels of service at the study intersections;
- Developed background traffic forecasts for project build-out in 2016 based on existing counts, traffic generated by other pending/future developments, and traffic pattern changes as a result of roadway improvements (where applicable);
- Determined background levels of service for the study intersections based on background traffic forecasts and existing traffic controls;

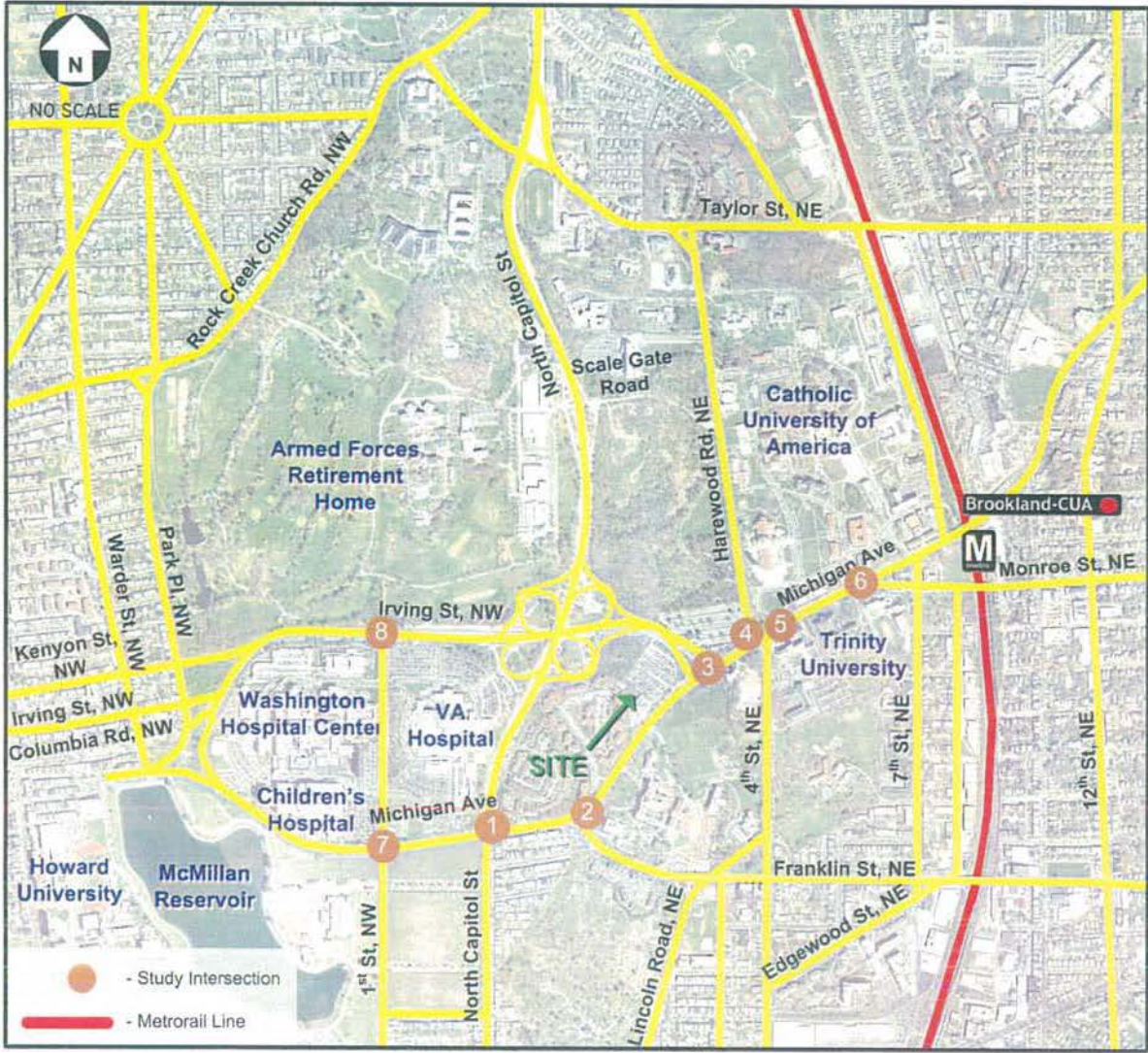


Figure 1 – Site Location Map



- Estimated the AM and PM peak hour and daily trips that would be generated by the full build-out of the proposed development (Phase I and Phase II Option 2), including mode split assumptions;
- Projected the total future (2016) traffic volumes based on background future traffic forecasts and site traffic assignments; and
- Calculated total future (2016) levels of service at the study intersections based on total future traffic forecasts, existing and future traffic controls, and existing and future intersection geometrics.

Sources of information for this study include traffic counts conducted by Gorove/Slade, ITE's Trip Generation, 7th Edition, conceptual site plans, the District Department of Transportation (DDOT), and the files/library of Gorove/Slade.

Project Scope

This traffic impact study was conducted in general accordance with parameters agreed to in a scoping letter to DDOT staff dated Wednesday, September 5, 2007 and several subsequent meetings with DDOT staff. A copy of the scoping letter is included in Appendix A.

The following intersections (shown in Figure 1) are included in this study:

- 1) North Capitol Street at Michigan Avenue
- 2) Michigan Avenue at Franklin Street, NE
- 3) Michigan Avenue at Irving Street, NE
- 4) Michigan Avenue at Harewood Road, NE
- 5) Michigan Avenue at 4th Street, NE
- 6) Michigan Avenue at Monroe Street, NE
- 7) Michigan Avenue at First Street, NW
- 8) Irving Street at First Street, NW

For purposes of this study, it was assumed that the proposed development could be fully built-out by year 2016. Several background developments are planned for the immediate area. These include the McMillan Sand Filtration Site, Washington Hospital Center Expansion and the Armed Forces Retirement Home Development.



EXISTING CONDITIONS

Site Access and Existing Road Network

Regional site access is provided primarily by Michigan Avenue and North Capitol Street. The key roadways providing local access within the study area are Michigan Avenue and Irving Street, which are both classified as minor arterials on the City's Functional Roadway System Classification Map (2003).

The physical and service characteristics of the key roadways providing immediate site access are as follows:

- *Michigan Avenue*

Michigan Avenue is a minor arterial running northeast-southwest to the south of the site. The roadway is a two-way, six-lane roadway between North Capitol Street and Monroe Street with three travel lanes in each direction and one designated parking lane in each direction. During the AM peak hour, parking restrictions result in an additional travel lane in the westbound direction while during the PM peak hour parking restrictions create an additional travel lane in the eastbound direction. Michigan Avenue is a major regional/commuter traffic route. The Average Daily Traffic (ADT) along Michigan Avenue ranges from 15,600 to 36,700 vehicles within the study area.

- *North Capitol Street*

North Capitol runs north-south to the west of the site. It is classified as a principal arterial south of Michigan Avenue, and a freeway/expressway north of Michigan Avenue to the intersection at Harewood Road. This roadway is a major regional/commuter route. The ADT along North Capitol Street within the study area is 32,400.

- *Irving Street*

Irving Street is a six-lane divided minor arterial which runs generally east-west along the northern and eastern perimeters of the site. The ADT is 17,600 along Irving Street, west of North Capitol Street.

Gorove/Slade conducted a field reconnaissance to obtain the existing lane usage and traffic controls at the intersections within the study area. Figure 2 presents the roadway lane configurations and traffic control devices provided at the intersections.

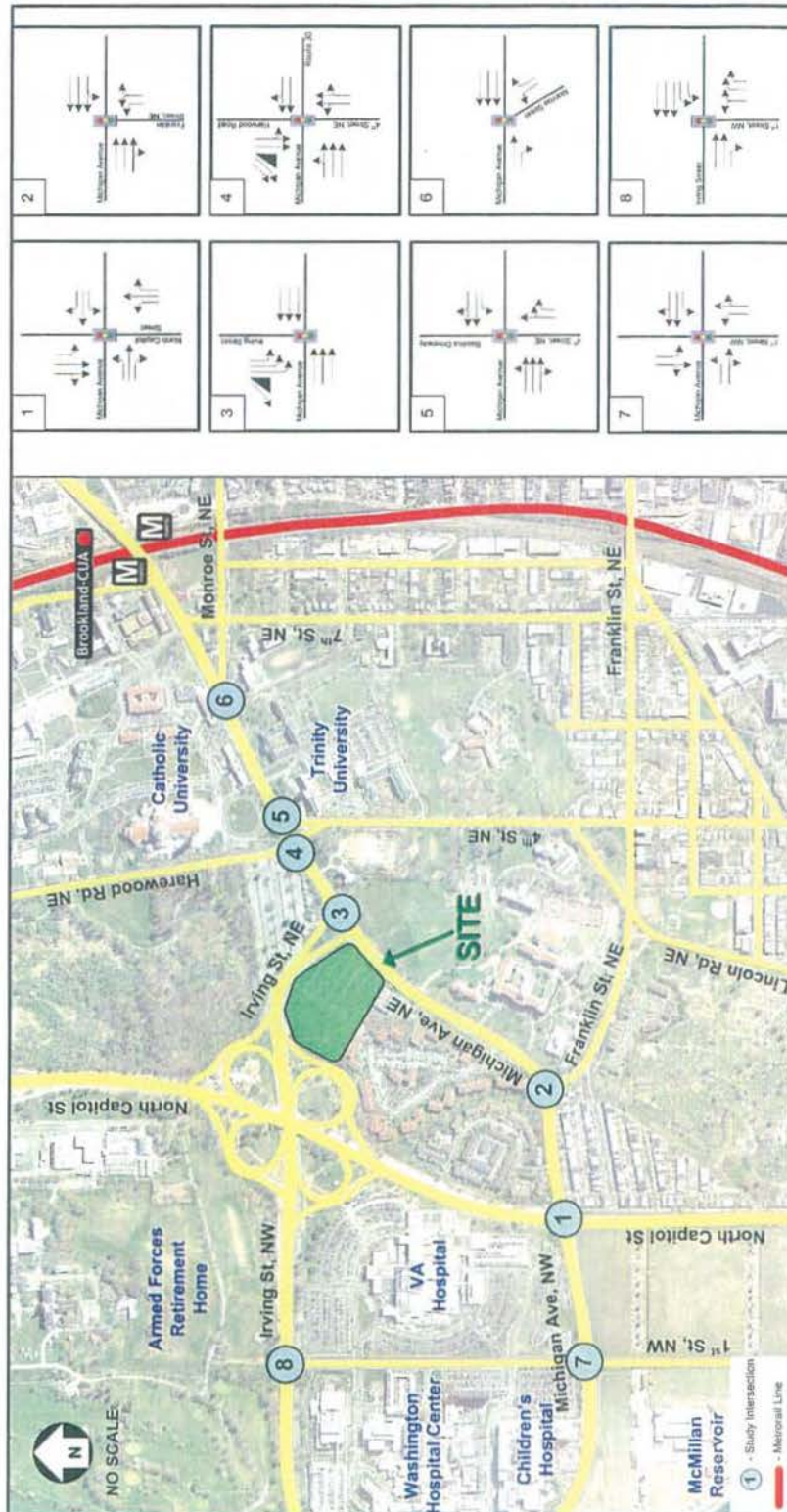


Figure 2 – Existing Lane Configuration and Traffic Control

Existing and Future Transit

The subject site is served by the Red Line of the WMATA Metrorail System. The nearest stop is at the Brookland-CUA Station which is situated approximately 0.64 miles (3,380 feet) to the east. The site is also served by several WMATA Metrobus routes, with connections to adjacent Metrorail stations. These transit facilities and services are illustrated in Figure 3.

Several nearby institutions (including Washington Hospital Center, Veterans Administration Hospital, Children's National Medical Center and Trinity College) provide shuttle services to and from the Brookland-CUA Station, with routes running along the study area roadways. The Washington Hospital Center shuttles also serve users of the fringe parking on the site. Figure 4 shows the shuttle routes within the study area.

DDOT is planning to implement a new Irving Street BRT (Bus Rapid Transit) route between Park Place, NW and the Brookland-CUA Metro Station, with dedicated lanes along Irving Street. This high-capacity transit corridor would connect planned developments along Irving Street and Michigan Avenue corridor with stops every half-mile. The service envisioned would be a more elaborate version of the MetroExtra limited stop service currently provided along Georgia Avenue. The project is likely to be implemented within the next 10 - 15 years.

Existing Volumes

Traffic counts were conducted at the key study intersections between the hours of 6:00 to 9:00 AM and 4:00 to 7:00 PM during September - October, 2008. The results of the traffic counts are included in Appendix B and summarized on Figure 4. The morning and afternoon peak hours for the system of intersections being studied occurred between 7:45 - 8:45 AM and 4:45 - 5:45 PM, respectively. The counts were used to determine the general traffic distribution patterns on the study area roadway network. These patterns are also illustrated on Figure 10.

Existing Capacity Analysis

Capacity analyses were performed to determine the existing Level of Service (LOS) for the AM and PM peak hours for the study intersections. A LOS grade is a letter grade based on the average delay (in seconds) experienced by motorists traveling through an intersection. LOS results range from "A" being the best to "F" being the worst. LOS D is typically used as the acceptable LOS threshold in the District; although LOS E and F are sometimes accepted in certain highly urbanized areas. The *Highway Capacity Manual 2000* (HCM) methodology was used for all analyses. Detailed LOS descriptions for signalized intersections are provided in Appendix C.

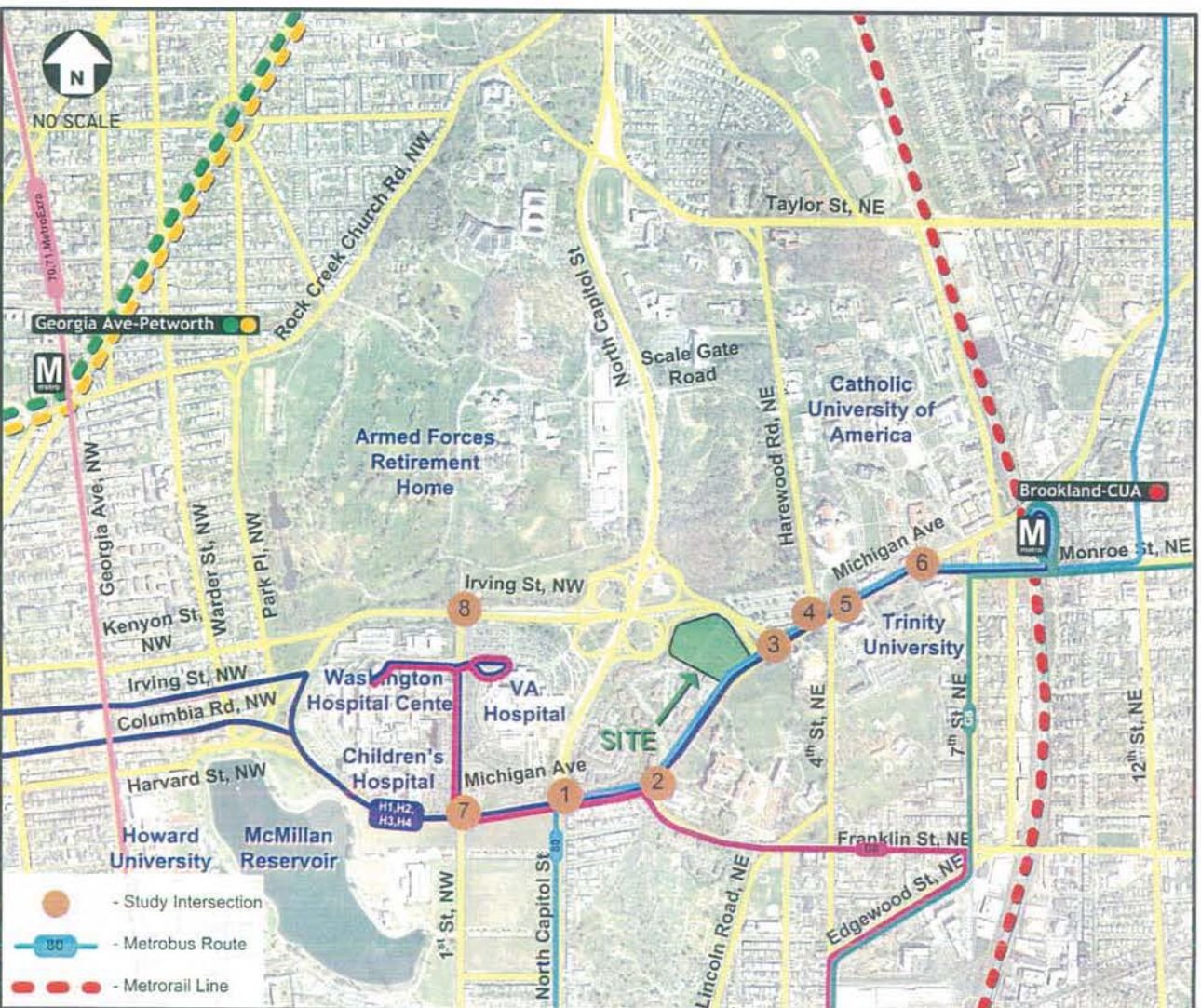


Figure 3 – Public Transportation

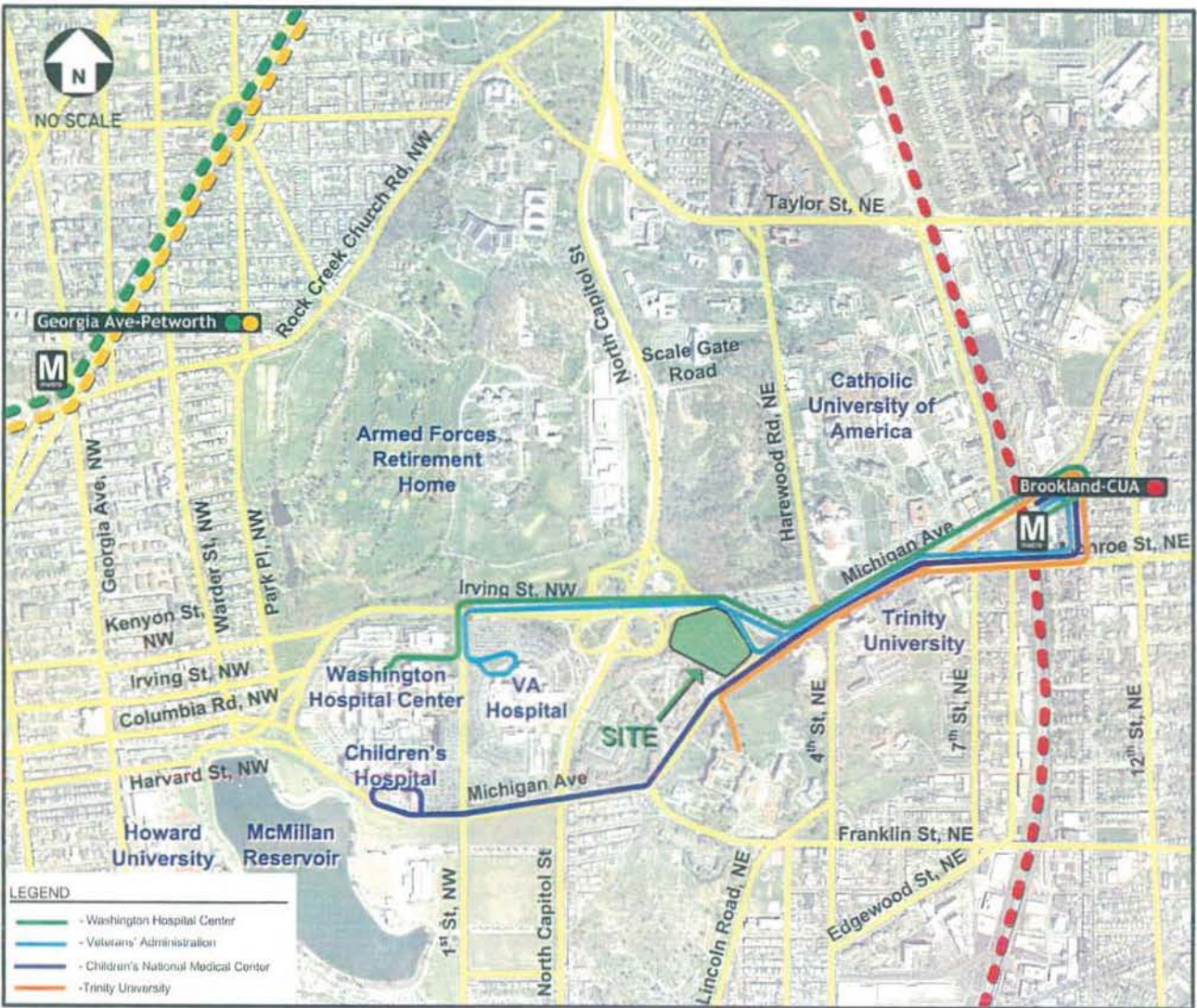


Figure 4 – Shuttle Routes



The existing LOS capacity analyses were based on: (1) the existing lane use and traffic controls shown on Figure 2; (2) the peak hour turning movement volumes shown on Figure 5; and (3) the *Highway Capacity Manual 2000* (HCM) methodologies (using Synchro 6 software). Copies of the LOS calculation worksheets are included in Appendix D. Table 1 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds). Figures 6a and 6b illustrate the LOS results for the morning and afternoon peak hours, respectively.

The capacity analyses show that all study area intersections operate at acceptable levels-of-service during both the AM and PM peak period, with the exception of the site access intersection along Irving Street which operates at LOS F during the PM peak hour.

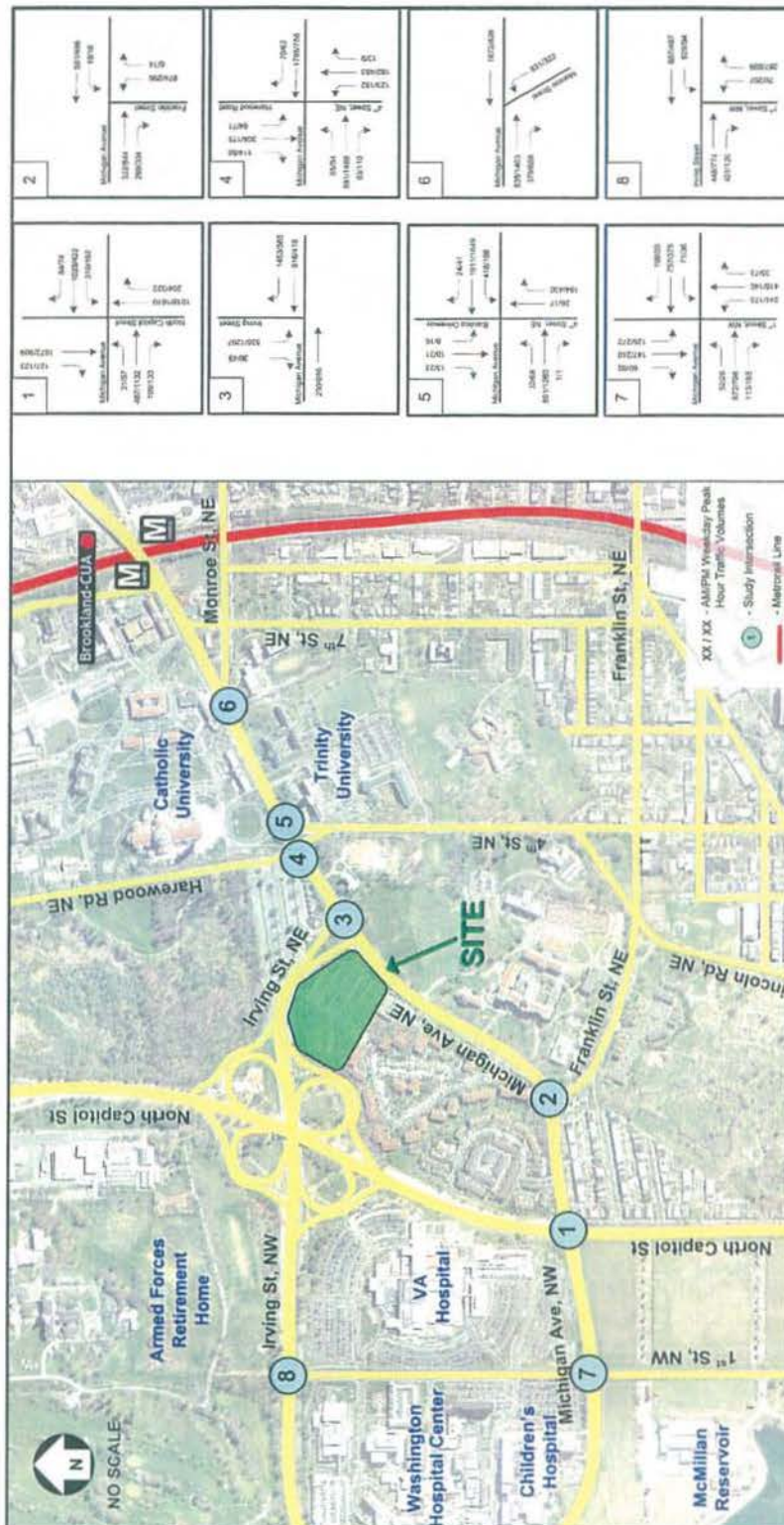


Figure 5 – Existing Peak Hour Traffic Volumes



Table 1 – Existing Levels of Service

Intersection (Approach)	Existing Conditions	
	AM Peak Hour Level of Service	PM Peak Hour Level of Service
North Capitol Street & Michigan Avenue		
Overall	C (30.6)	C (34.5)
Eastbound	D (48.2)	D (48.2)
Westbound	C (31.7)	D (40.1)
Northbound	C (23.7)	C (31.1)
Southbound	C (28.3)	C (20.3)
Michigan Avenue & Franklin Street		
Overall	C (22.0)	B (13.0)
Eastbound	A (0.6)	A (1.0)
Westbound	A (0.7)	B (15.4)
Northbound	D (52.1)	D (43.0)
Michigan Avenue & Irving Street		
Overall	A (6.9)	B (13.4)
Eastbound	C (28.3)	B (20.0)
Northbound	A (5.8)	A (9.5)
Southbound	A (1.1)	A (7.4)
Michigan Avenue & Harewood Street		
Overall	B (15.0)	C (31.2)
Eastbound	C (23.7)	C (32.7)
Westbound	A (2.6)	A (0.4)
Northbound	C (33.5)	E (62.5)
Southbound	D (36.0)	D (35.8)
Michigan Avenue & 4 th Street		
Overall	D (45.4)	C (25.8)
Eastbound	A (6.9)	A (2.5)
Westbound	E (58.5)	C (32.0)
Northbound	C (33.0)	E (64.8)
Southbound	C (29.6)	D (37.6)
Monroe Street & Michigan Avenue		
Overall	B (16.9)	C (23.8)
Westbound	C (25.2)	C (29.4)
Northbound	A (4.1)	D (37.3)
Southbound	C (19.7)	A (4.6)
Michigan Avenue & Site Access		
Eastbound Left	A (9.5)	B (10.8)
Southbound Through	B (10.7)	B (10.3)
Irving Street & Site Access		
Northbound Left	D (30.9)	F (82.0)
Michigan Avenue & First Street		
Overall	C (23.1)	C (31.8)
Eastbound	B (17.1)	B (10.1)
Westbound	B (18.0)	A (8.0)
Northbound	D (35.4)	E (56.3)
Southbound	C (28.5)	E (71.2)
Irving Street & First Street		
Overall	B (16.7)	B (18.9)
Eastbound	B (18.1)	B (16.2)
Westbound	B (16.1)	B (15.5)
Northbound	B (15.7)	C (23.6)

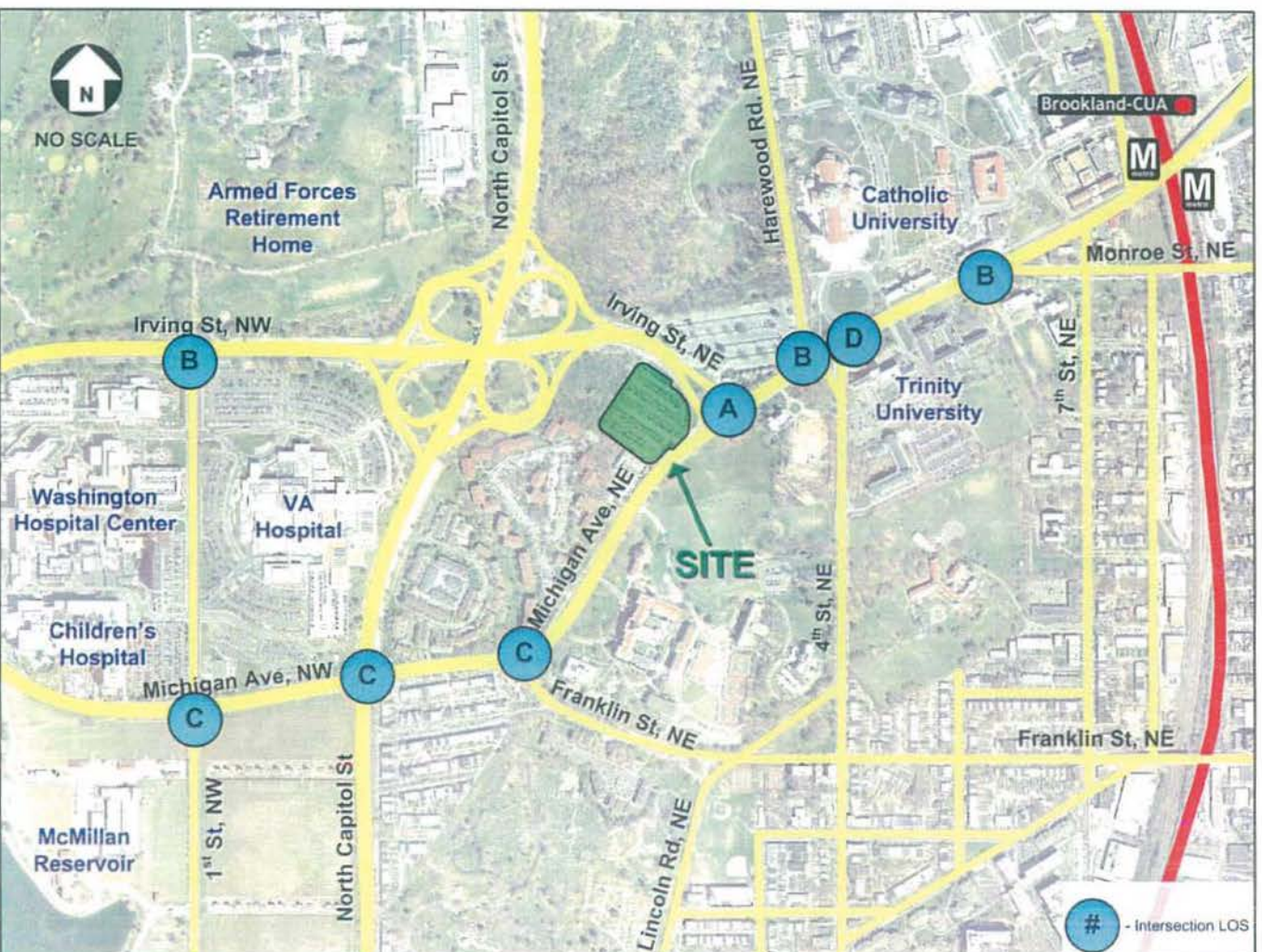


Figure 6a – Existing Levels of Service - AM Peak Hour

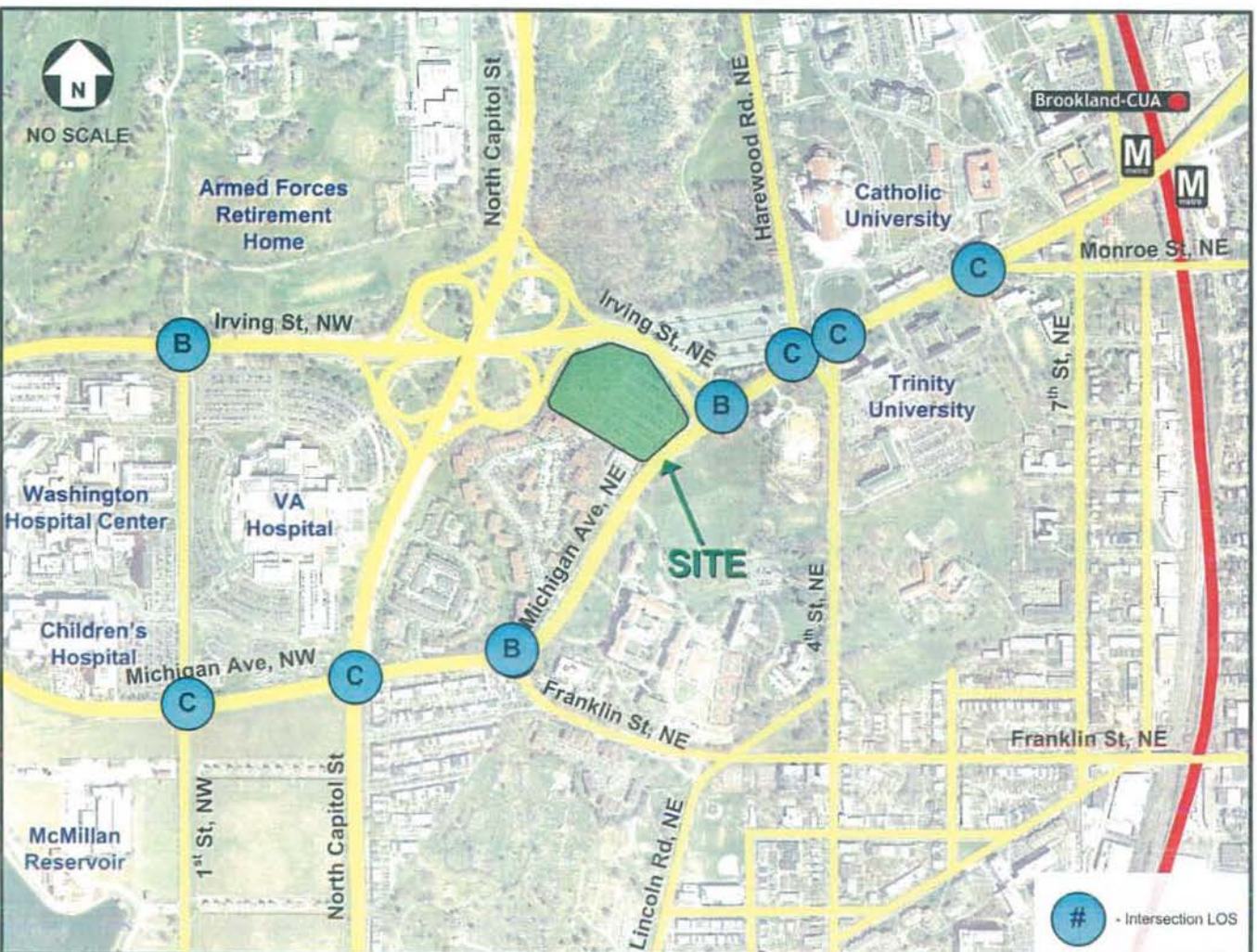


Figure 6b – Existing Levels of Service - PM Peak Hour

FUTURE (2016) BACKGROUND CONDITIONS

Future background conditions represent the projected future traffic levels without the proposed development. These conditions are a basis for comparison to the total future conditions, which include the proposed development.

For the purposes of this study, it was assumed that the proposed development could be completed by 2016. A composite of existing traffic, regional growth and the projected trip generation from other planned area developments was used to develop the background traffic forecasts.

Regional Traffic Growth

Review of DDOT Average Annual Daily Traffic (AADT) Maps indicate that traffic volumes have either remained stable, increased marginally or declined over the period 2001 - 2006. Taking a conservative (high side) approach, this study applies an annual growth rate (1%) to through traffic movements along the major study area roadways.

Future Background Developments

Several background developments are planned for the study area. The land use programs and projected peak hour trip generation for the background developments are presented in Table 2. This table indicates that those developments would generate approximately 6,380 and 8,260 trips during the morning and afternoon peak hours, respectively. These trips would have significant impacts on the study area roadway network. However, it should be noted that the developments have been the subject of various planning and design efforts over the last 10± years, and their land use programs and build-out timeframes are still uncertain at this time.

Figure 7 shows the projected (2016) background traffic volumes, based on the assumed annual regional traffic growth and the projected trip generation for the background developments considered.



Table 2 – Background Developments Trip Generation

Land Use	ITE Land Use Code	Size	Trip Generation						
			AM Peak Hour			PM Peak Hour			
			In	Out	Total	In	Out	Total	
MacMillan Mews (Sand Filtration Site)									
Residential	220	448	Dwelling Units	45	178	223	172	92	264
	230	552	Dwelling Units	<u>35</u>	<u>168</u>	<u>203</u>	<u>163</u>	<u>81</u>	<u>244</u>
				80	346	426	335	173	508
synergy with retail							(39)	(27)	(66)
synergy with office							(6)	-	(6)
Residential (with synergy)				45	178	223	133	65	198
transit reduction		15%		(7)	(27)	(33)	(20)	(10)	(30)
Residential Subtotal				38	151	190	113	55	168
Retail	820	110	kSF	101	65	166	320	347	667
synergy with residential							(27)	(39)	(66)
synergy with office							(6)	(10)	(16)
Retail (with synergy)				101	65	166	293	308	601
transit reduction		15%		(15)	(10)	(25)	(44)	(46)	(90)
Retail Subtotal				86	55	141	249	262	511
General Office Building	710	684	kSF	768	105	873	144	701	845
synergy with retail							(10)	(6)	(16)
synergy with residential							-	(6)	(6)
General Office Building (with synergy)				768	105	873	134	689	823
transit reduction		15%		(115)	(16)	(131)	(20)	(103)	(124)
General Office Building Subtotal				653	89	742	114	586	699
Hotel	310	63	Occupied Rooms	11	8	19	15	16	31
transit reduction		15%		(2)	(1)	(3)	(2)	(2)	(5)
Hotel Subtotal				9	7	16	13	14	26
MacMillan Mews Total				786	302	1,089	489	917	1,404
AFRH Development									
Residential	220	3,300	Dwelling Units	324	1,297	1,621	1,191	642	1,833
	230	77	Dwelling Units	<u>7</u>	<u>35</u>	<u>42</u>	<u>33</u>	<u>16</u>	<u>49</u>
				331	1,332	1,663	1,224	658	1,882
synergy with retail							(49)	(34)	(83)
synergy with Office							(19)	-	(19)
Residential (with synergy)				331	1,332	1,663	1,156	624	1,780



transit reduction		15%		(50)	(200)	(249)	(173)	(94)	(267)
Residential Subtotal				281	1,132	1,414	983	530	1,513
Retail	820	140	kSF	117	75	192	375	407	782
synergy with residential							(34)	(49)	(83)
synergy with Office							(8)	(12)	(20)
Retail (with synergy)				117	75	192	334	346	680
transit reduction		15%		(18)	(11)	(29)	(50)	(52)	(102)
Retail Subtotal				99	64	163	284	294	578
General Office Building	710	950	kSF	1,000	136	1,136	194	949	1,143
synergy with retail							(12)	(8)	(20)
synergy with residential								(19)	(19)
General Office Building (with synergy)				1,000	136	1,136	182	923	1,104
transit reduction		15%		(150)	(20)	(170)	(27)	(138)	(166)
General Office Building Subtotal				850	116	966	155	785	938
Hotel	310	123	Rooms	38	28	66	33	35	68
transit reduction		15%		(6)	(4)	(10)	(5)	(5)	(10)
Hotel Subtotal				32	24	56	28	30	58
AFRH Total				1,262	1,336	2,599	1,450	1,639	3,087
Catholic University Parcel									
Residential	220	800	Dwelling Units	79	317	396	298	160	458
synergy with retail							(34)	(24)	(58)
Residential (with synergy)				79	317	396	264	136	400
transit reduction		15%		(12)	(48)	(59)	(40)	(20)	(60)
Residential Subtotal				67	269	337	224	116	340
Retail	820	81	kSF	84	54	138	262	283	545
synergy with residential							(24)	(34)	458
Retail (with synergy)				151	323	475	462	365	1,343
transit reduction		15%		(23)	(48)	(71)	(69)	(55)	(202)
Retail Subtotal				128	275	404	393	310	1,141
Catholic University Parcel Total				195	544	741	618	427	1,482
Washington Hospital Center*	610	930	kSF	1,386	572	1,958	603	1,686	2,289
Total Background Development Trips				3,629	2,754	6,387	3,159	4,669	8,262

Source: *Trip Generation Manual, 7th Edition*. Institute of transportation Engineers. 2003. Note: data for AM Peak Hour and PM Peak Hour show data for Peak Hour of Adjacent Street Traffic between, respectively, 7 - 9 am and 4 - 6 pm, when provided.

* MedStar/Washington Hospital Center Rezoning Application - Transportation Impact Analysis, May 11, 2008 (O.R. George & Associates, Inc.)

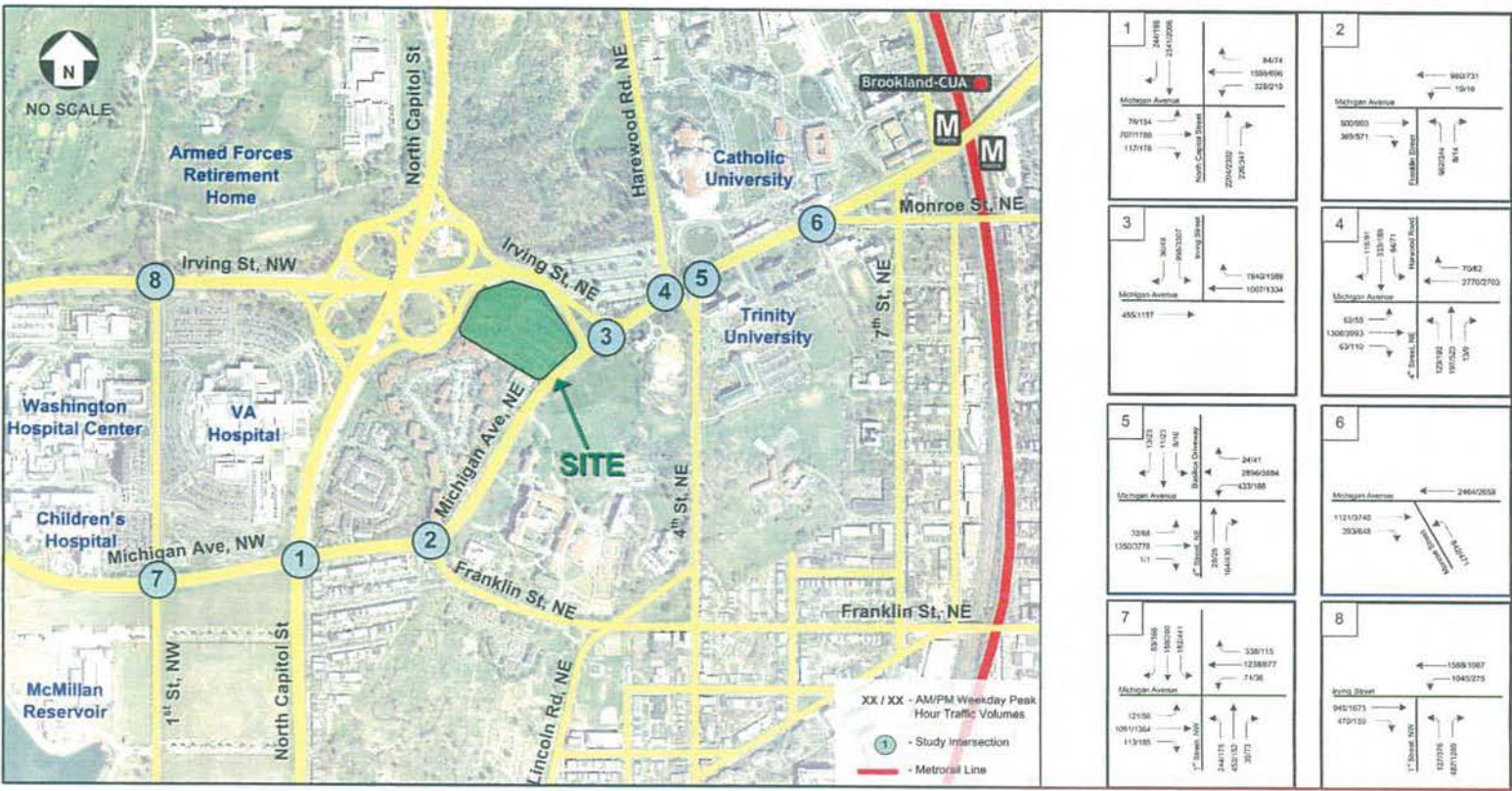


Figure 7 – Background Traffic Forecasts

December, 2008

Future (2016) Background Analyses

The future background peak hour levels of service (without the proposed development) were calculated based on: (1) existing lane use and traffic controls shown on Figure 2; (2) the background traffic volumes shown on Figure 7 and; (3) the *Highway Capacity Manual 2000* (HCM) methodologies (using Synchro 6 software).

The capacity analyses indicate that the majority of the study area intersections would operate at capacity, primarily due to projected heavy commuter peak hour traffic volumes along the major roadways (Michigan Avenue, Irving Street and North Capitol Street). As noted earlier, these traffic projections were based on the application of an annual growth rate (1.0%) to existing through/regional traffic until 2016, and consideration of several significant background developments planned for the study area. Review of DDOT Average Annual Daily Traffic (AADT) Maps indicate that traffic volumes have either remained stable, increased marginally or declined over the period 2001 - 2006. It is also noted that the background developments have been the subject of various planning efforts over the last 10± years, and their land use programs and build-out timeframes remain uncertain at this time.

Table 3 displays the results of the capacity analyses, including LOS and average delay per vehicle (in seconds). Figures 8a and 8b graphically show the overall LOS results. Copies of LOS calculation worksheets are included in Appendix D.



Table 3 – Background Levels of Service

Intersection (Approach)	Background Conditions	
	AM Peak Hour	PM Peak Hour
	Level of Service	Level of Service
Michigan Avenue & North Capitol Street		
Overall	F (116.7)	F (142.8)
Eastbound	F (151.5)	F (231.1)
Westbound	F (124.5)	D (40.9)
Northbound	F (114.5)	F (158.3)
Southbound	F (100.7)	D (88.7)
Michigan Avenue & Franklin Street		
Overall	B (16.7)	A (5.6)
Eastbound	A (2.7)	A (0.2)
Westbound	B (13.0)	A (4.9)
Northbound	C (33.0)	D (30.8)
Michigan Avenue & Irving Street		
Overall	A (8.3)	E (55.4)
Eastbound	C (33.2)	F (95.9)
Northbound	A (5.3)	E (77.7)
Southbound	A (0.1)	A (0.1)
Michigan Avenue & Harewood Street		
Overall	E (74.9)	F (284.4)
Eastbound	A (4.6)	F (432.4)
Westbound	F (120.3)	F (123.3)
Northbound	D (45.6)	F (171.6)
Southbound	D (39.0)	C (34.0)
Michigan Avenue & 4 th Street		
Overall	E (59.2)	F (363.1)
Eastbound	B (15.7)	F (475.3)
Westbound	E (78.4)	F (284.9)
Northbound	D (41.5)	F (163.0)
Southbound	D (37.6)	D (35.8)
Monroe Street & Michigan Avenue		
Overall	B (19.0)	F (156.6)
Westbound	D (38.3)	D (42.7)
Northbound	A (8.1)	F (253.4)
Southbound	B (19.2)	A (9.8)
Michigan Avenue & Site Access		
Eastbound Left	A (10.0)	D (29.3)
Southbound Through	B (11.9)	B (13.1)
Irving Street & Site Access		
Northbound Left	F (63.1)	F (error)
Michigan Avenue & First Street		
Overall	F (95.8)	D (40.3)
Eastbound	E (57.6)	E (60.5)
Westbound	A (9.8)	B (15.6)
Northbound	F (271.2)	D (46.9)
Southbound	E (61.0)	C (29.2)
Irving Street & First Street		
Overall	D (43.1)	F (82.6)
Eastbound	D (49.3)	F (100.3)
Westbound	D (44.2)	D (53.6)
Northbound	C (25.6)	F (103.9)
Southbound	D (35.9)	D (45.3)

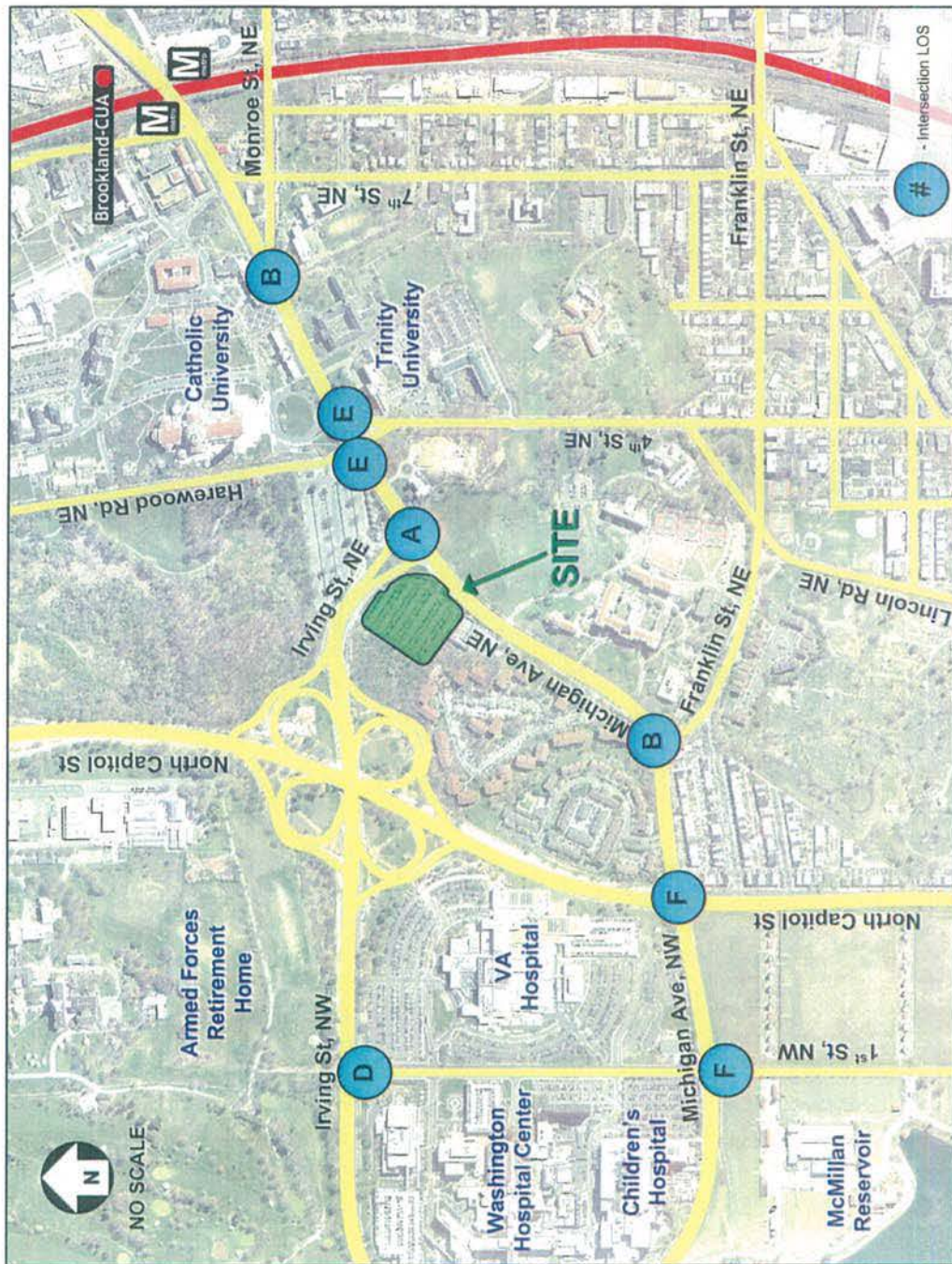


Figure 8a – Background Levels of Service - AM Peak Hour

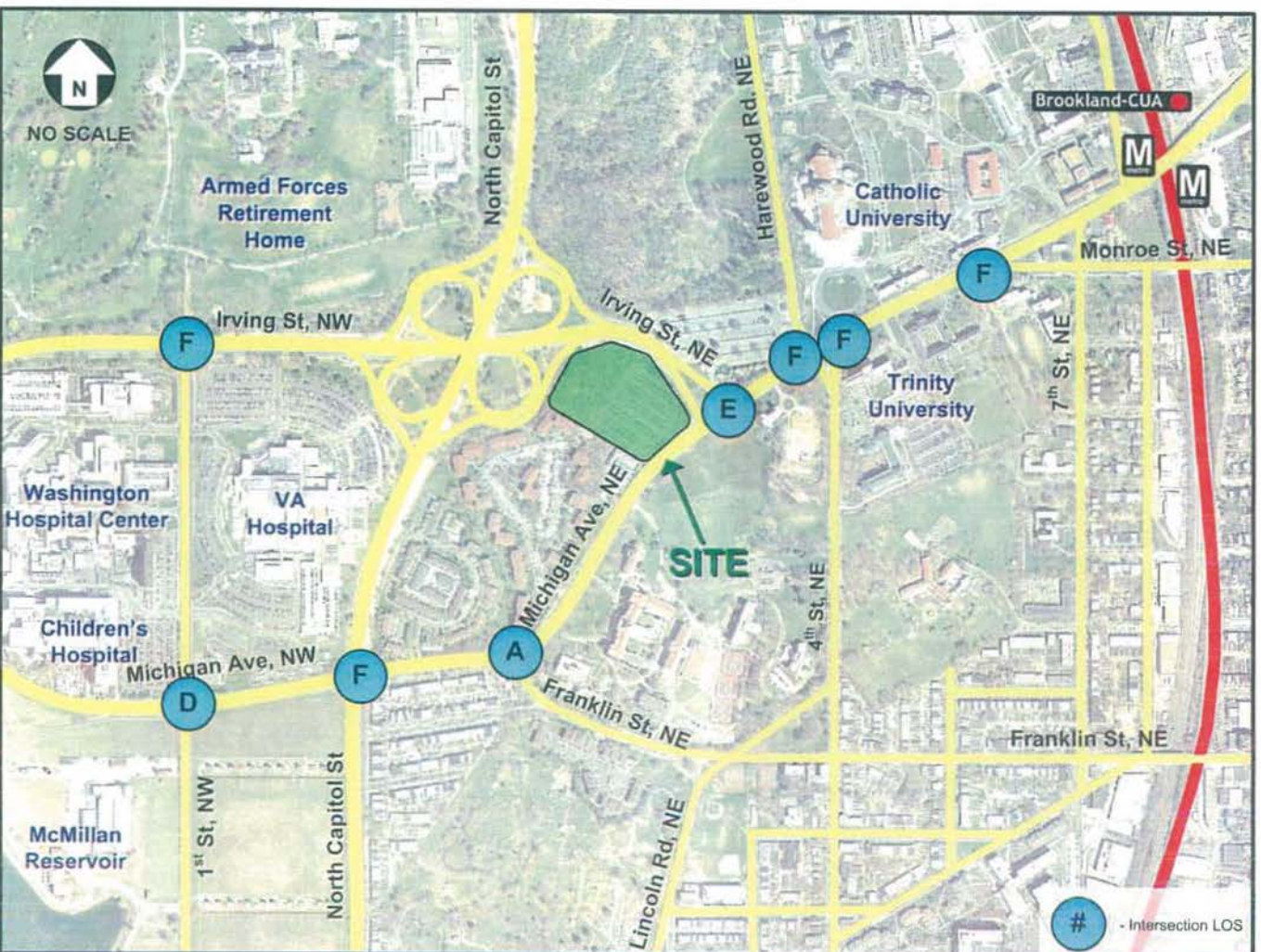


Figure 8b – Background Levels of Service - PM Peak Hour



TOTAL FUTURE (2016) TRAFFIC CONDITIONS

The total future (2016) traffic conditions were developed by combining the future background traffic situation (Figure 7) and the projected trip generation for the proposed development. As noted earlier, the site currently serves as a fringe parking lot for the Washington Hospital Center. The Applicant plans to redevelop the site in the following two phases:

Phase I

- 314-room hotel (including a 30,000 SF conference center)
- 18,000 SF of retail
- 5,000 SF restaurant
- 301-space parking garage
- 280 surface parking spaces

Phase II (Option 1)

- 240 residential apartments
- 220 space underground garage replacing the Phase I surface parking

Phase II (Option 2)

- 120 residential apartments
- 200 room hotel
- 220 space underground garage replacing the Phase I surface parking
- 174-space addition to Phase I parking deck

Vehicular access will be provided via an entrance each off Michigan Avenue and Irving Street.

Off-Street Parking

The off-street parking spaces required by the District Municipal Regulations and the proposed parking are compared in the table following:

Table 4 – Parking Requirements Vs Proposed Parking

Land Use	Required Parking		Proposed Parking
	Ratio	Supply	
Phase I			
- Hotel (314 Rooms)	1 per 2 rooms	157	
- Largest Conference Center Room (7,500 SF)	1 per 150 SF	50	
- Restaurant (5,000 SF) + Retail (18,000 SF)	1 per 300 SF in excess of 3,000 SF	67	
Sub-Total		274	581*
Phase II Option 2			
- Hotel (200 Rooms)	1 per 2 Rooms	100	
- Apartments (120 Units)	1 per 2 Units	60	
Sub-Total		160	114**
Total		434	695

* Includes 280 WHC replacement parking spaces.

** The net of replacing the Phase I surface parking (280 spaces) with a 220-space underground garage and adding 174 spaces to the Phase I deck.

Table 4 shows the proposed parking would satisfy the District's parking requirements. The Applicant also plans to provide bicycle parking spaces in accordance with DDOT requirements. It is therefore anticipated that parking demand will not spill over from the site to adjacent properties and neighborhood streets.

Loading Berths and Truck Movements

The loading facility requirements for Phase I of the proposed development, as stipulated by Chapter 22 of the District of Columbia Municipal Regulations, are as follows:

- One 55-ft deep berth + one 200 SF platform;
- Three 30-ft deep berths + three 100 SF platforms; and
- One 20-ft deep berth.

Phase I of the proposed development would include one 55-foot loading berth, one 30-foot loading berth and a designated trash area for the hotel and conference center. For the retail uses, one 30-foot loading berth and a designated trash area would be provided. These facilities would adequately satisfy the loading needs of the project. Adequate turning radii and maneuvering space would be provided to ensure that delivery trucks enter the site, maneuver into loading areas and exit the site efficiently without adverse impacts on other traffic movements on site and along the adjacent roadways.

Site Access

The site is currently provided with two access points, one each off Michigan Avenue and Irving Street. The site plan proposes the relocation of the Michigan Avenue driveway approximately 30 feet to the north. The existing Irving Street access is located within a horizontal roadway curve and at the end of a deceleration lane extending from the North Capitol Street northbound to Irving Street eastbound off-ramp. These conditions create sight distance and operational constraints for left-turn movements from the site. Left-turns from and into the site also occur with much difficulty due to the narrow width of the median (6 ft) which does not provide sufficient storage for a safe two-step left-turn maneuver. To address these deficiencies, the Applicant proposes to provide the following improvements at the Irving Street entrance:

- Relocate the entranceway approximately 50-feet east of its present location;
- Install a traffic signal and an advanced flashing beacon;
- Provide a separate left-turn lane along the westbound approach of Irving Street; and
- Provide improved roadway striping and signage to allow efficient and safe merging of mainline and ramp vehicles approaching from the west.

Figure 9 illustrates these improvements. This figure also shows potential improvements related to a planned transit-way along Irving Street.

Projected Site Trip Generation

The number of anticipated vehicle trips generated by the proposed development was estimated based on data provided in the ITE's *Trip Generation*, 7th Edition. According to the rates and equations provided by ITE, the proposed development would generate a total of 398 AM peak hour trips (183 in and 215 out), 539 PM peak hour trips (295 in and 244 out) and 6,396 daily trips with Phase I and Phase II Option 1; and a total of 312 AM peak hour trips (245 in and 221 out), 595 PM peak hour trips (312 in and 283 out) and 7,308 daily trips with Phase I and Phase II Option 2. This is without any reduction in the trips as a result of the site's proximity and access to public rail and bus transportation.

Trip Reductions

By definition, ITE's trip generation rates were derived from data collected from single-use developments where virtually all access was by private automobile (Source- *ITE Trip Generation Manual*, 2nd Edition, Appendix B). The trip generation rates do not account for the potential effects of Transit Demand Management (TDM) programs, transit availability, pass-by trips, and interaction between various on-site uses (synergy), particularly when these uses are within walking distance of each other.

Pass-by Trips. According to ITE's *Trip Generation Handbook*, 2nd Edition, retail-oriented developments such as shopping centers are often located adjacent to busy streets in order to attract the motorists already on the street. These sites attract a portion of their trips from traffic passing the site on the way from an origin to an ultimate destination. These retail trips may not add new traffic to the adjacent street system. The development site fronts on two heavily traveled roadways and the proposed restaurant use is expected to attract motorists that may be driving to/from the District (and surrounding neighborhoods). Based on information provided in ITE's *Trip Generation Handbook*, 2nd Edition, a 40% reduction in weekday restaurant trips, was taken as shown in Table 5.

Alternate Mode Reduction. According to the WMATA *Development-Related Ridership Survey II Report* (2005), the mode choice for trips is significantly influenced by the location of the site within Metropolitan Washington and the proximity to the Metrorail station. This study was prepared to model the travel patterns of persons traveling to and from, residential developments and commercial entities close to Metrorail stations, "and to establish relationships among travel characteristics, distance, and the nature of development at each site."

Based on the WMATA models and the distance of the site from the Brookland-CUA Metrorail, a 30% reduction was applied to the hotel, restaurant, retail and residential trips. As noted earlier in this study, several shuttles operate along Michigan Avenue adjacent to the site.

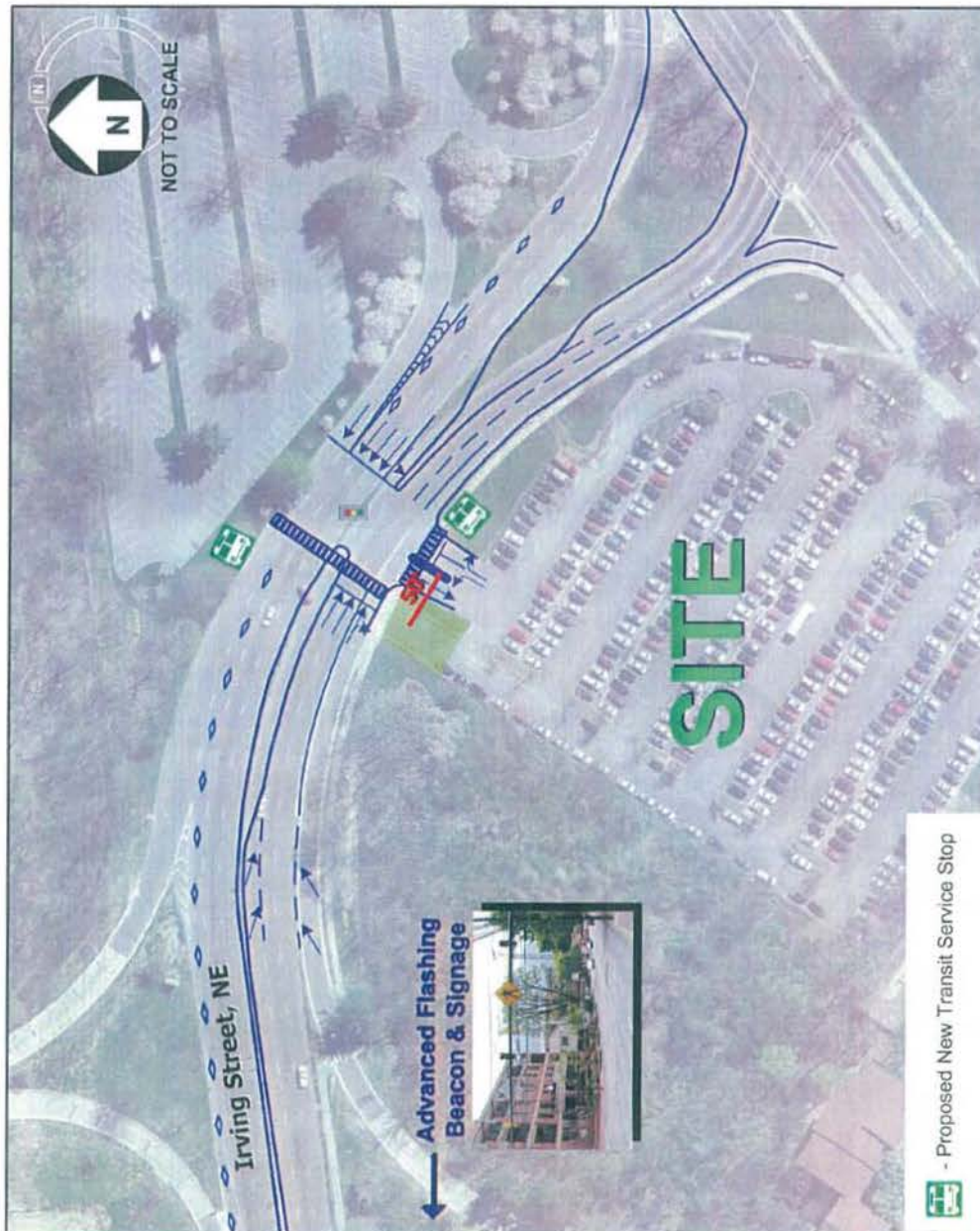


Figure 9 – Proposed Irving Street Access Improvements

The Washington Hospital Center shuttles would continue to stop at the site until the beginning of the Phase II development. There is the strong likelihood that arrangements would be made to have externally provided shuttle services continue after the full build-out of the site. The proposed hotel may also operate its own shuttle service with connections to nearby Metrorail stations and other land uses.

Table 5 shows the projected peak hour site trip generation. With the assumed reductions described above, the proposed development would generate a total of 342 AM and 351 PM total peak hour trips under the worse-case scenario (Phase I and Phase II Option 2).

As noted earlier, the site is improved with a fringe parking lot which serves the Washington Hospital Center. Upon full build-out of the proposed development (Phase I and Phase II Option 2), the trips generated by the fringe parking lot will still be on the study area roadways, as the Washington Hospital Center is expected to construct new/upgraded parking facilities within its complex along First Street or seek replacement parking within adjacent planned developments including the Armed Forces retirement Home. Based on these considerations, the projected site impacts would be related to the new/additional trips generated by the proposed development. The existing parking lot use currently attracts 97 AM and 117 PM total trips. Therefore, the new/additional trips would be 245 and 234 during the morning and afternoon peak hours, respectively. The increase in study area traffic volumes, represented by those additional trips, would be in the range 1.5% for both the AM and PM peak hours.

Projected Site Trip Distribution

The assessment of the impacts of the proposed development (in the sections following) is based on the trip generation for an initial development program (326 AM and 501 PM), taking a conservative (high side) approach. These trips were assigned to the study area road network based on existing travel patterns identified during data collection, our familiarity with traffic conditions within the general area, as well as the site layout and access. The assumed trip distributions are shown in Figure 10 and the resulting trip assignments are shown in Figure 11.

Total Future (2016) Traffic Forecast

The site-generated traffic assignments depicted on Figure 11 were combined with the background traffic forecasts shown on Figure 7 to yield the total future (2016) traffic forecasts. The total traffic situation is shown on Figure 12.



Table 5 – Projected Site Trip Generation

Proposed Development	ITE Code	Amount	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Phase IA								
Hotel with Conference Center	310	233 Rooms	88	64	152	72	75	147
Alternate Mode Red. (30%)			<u>-26</u>	<u>-19</u>	<u>-45</u>	<u>-22</u>	<u>-23</u>	<u>-45</u>
Hotel Total			62	45	107	50	52	102
Restaurant	932	5,000 SF	30	28	58	34	21	55
Pass-by Trips (40%)						-14	-8	-22
Alternate Mode Red. (30%)			<u>-9</u>	<u>-8</u>	<u>-17</u>	<u>-10</u>	<u>-6</u>	<u>-16</u>
Restaurant Total			21	20	41	10	7	17
Retail	820	18,000 SF	35	21	56	97	105	202
Pass-by Trips (40%)						-39	-42	-81
Alternate Mode Red.(30%)			<u>-11</u>	<u>-6</u>	<u>-17</u>	<u>-29</u>	<u>-32</u>	<u>-61</u>
Retail Total			24	15	39	29	31	60
Phase IB								
Hotel	310	81 Rooms	19	14	33	20	21	41
Alternate Mode Red. (30%)			<u>-6</u>	<u>-4</u>	<u>-10</u>	<u>-6</u>	<u>-6</u>	<u>-12</u>
Hotel Total			13	10	23	14	15	29
Phase II Option 1								
Residential	220	240 DU	24	97	121	98	52	150
Alternate Mode Red. (30%)			<u>-7</u>	<u>-29</u>	<u>-36</u>	<u>-29</u>	<u>-16</u>	<u>-45</u>
Residential Total			17	68	85	69	36	105
Phase II Option 2								
Residential	220	120 DU	13	50	63	55	29	84
Alternate Mode Red. (30%)			<u>-4</u>	<u>-15</u>	<u>-19</u>	<u>-17</u>	<u>-9</u>	<u>-26</u>
			<u>9</u>	<u>35</u>	<u>44</u>	<u>38</u>	<u>20</u>	<u>58</u>
Hotel	310	200 Rooms	<u>73</u>	<u>53</u>	<u>126</u>	<u>60</u>	<u>62</u>	<u>122</u>
Alternate Mode Red. (30%)			51	37	88	42	43	85
Total - Phase I + Phase II Option 1 (with reductions)			137	158	295	172	141	313
Total - Phase I + Phase II Option 2 (with reductions)			180	162	342	183	168	351

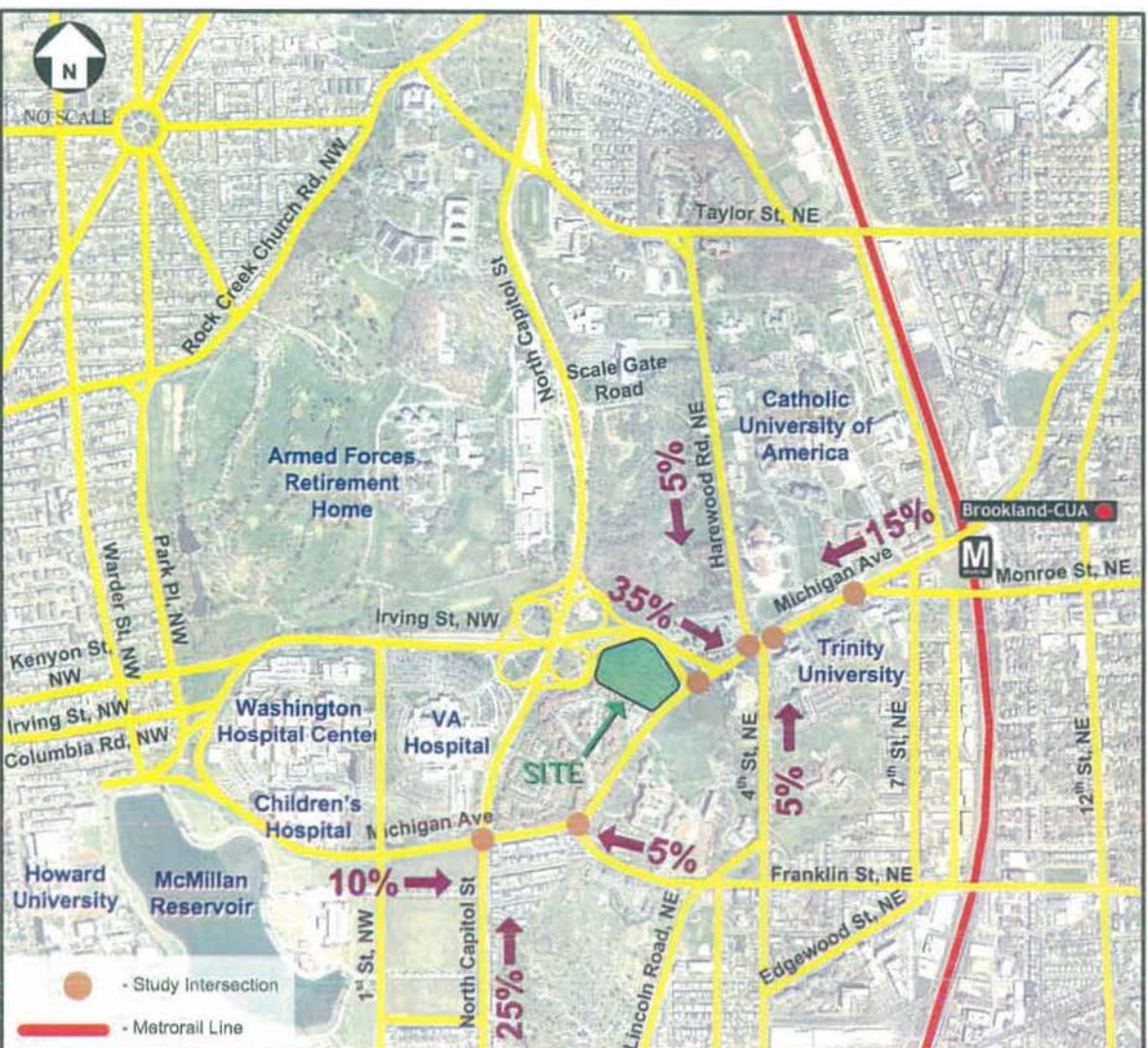


Figure 10 – Directional Trip Distributions

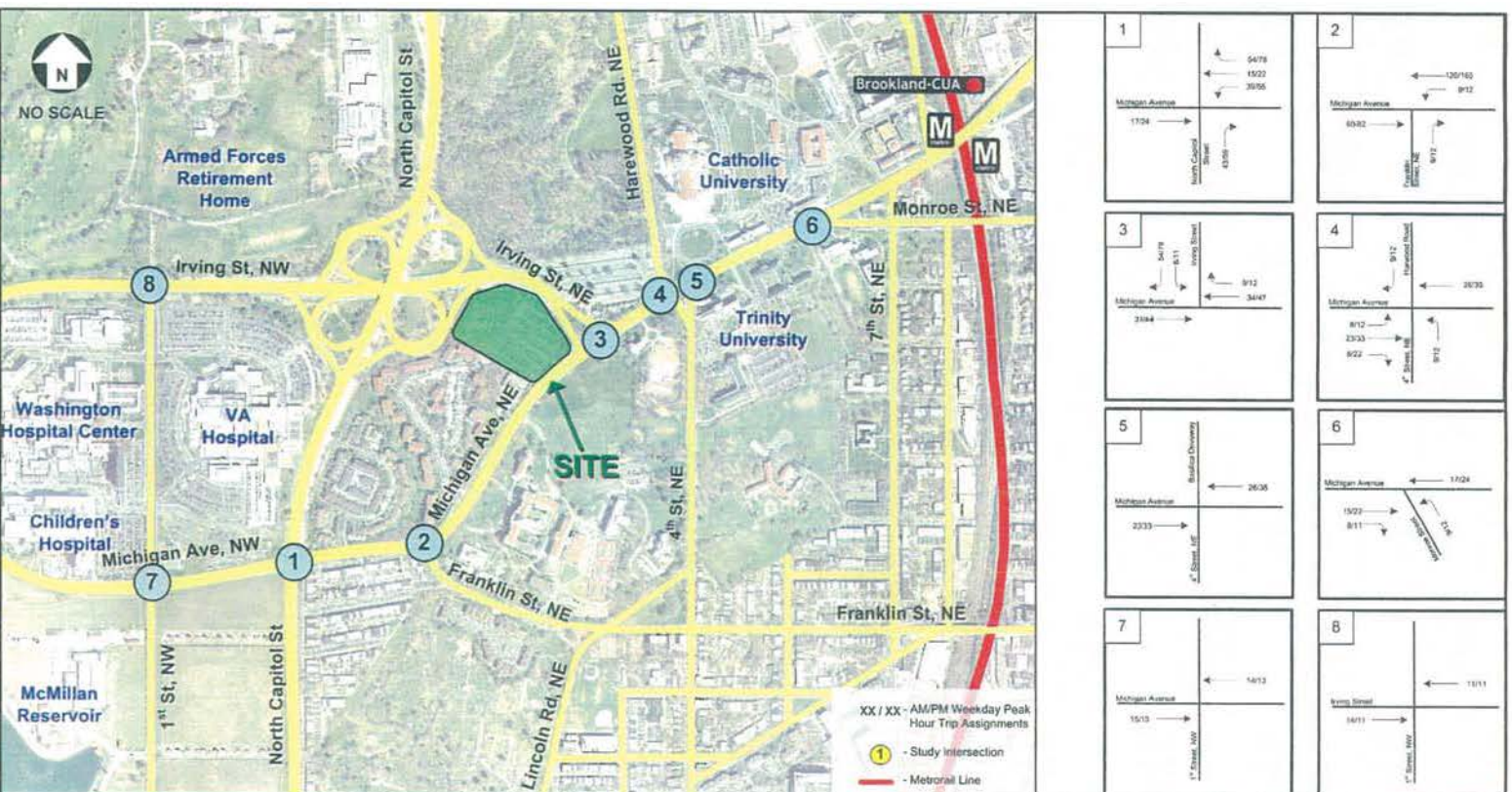


Figure 11 – Site Traffic Trip Assignments

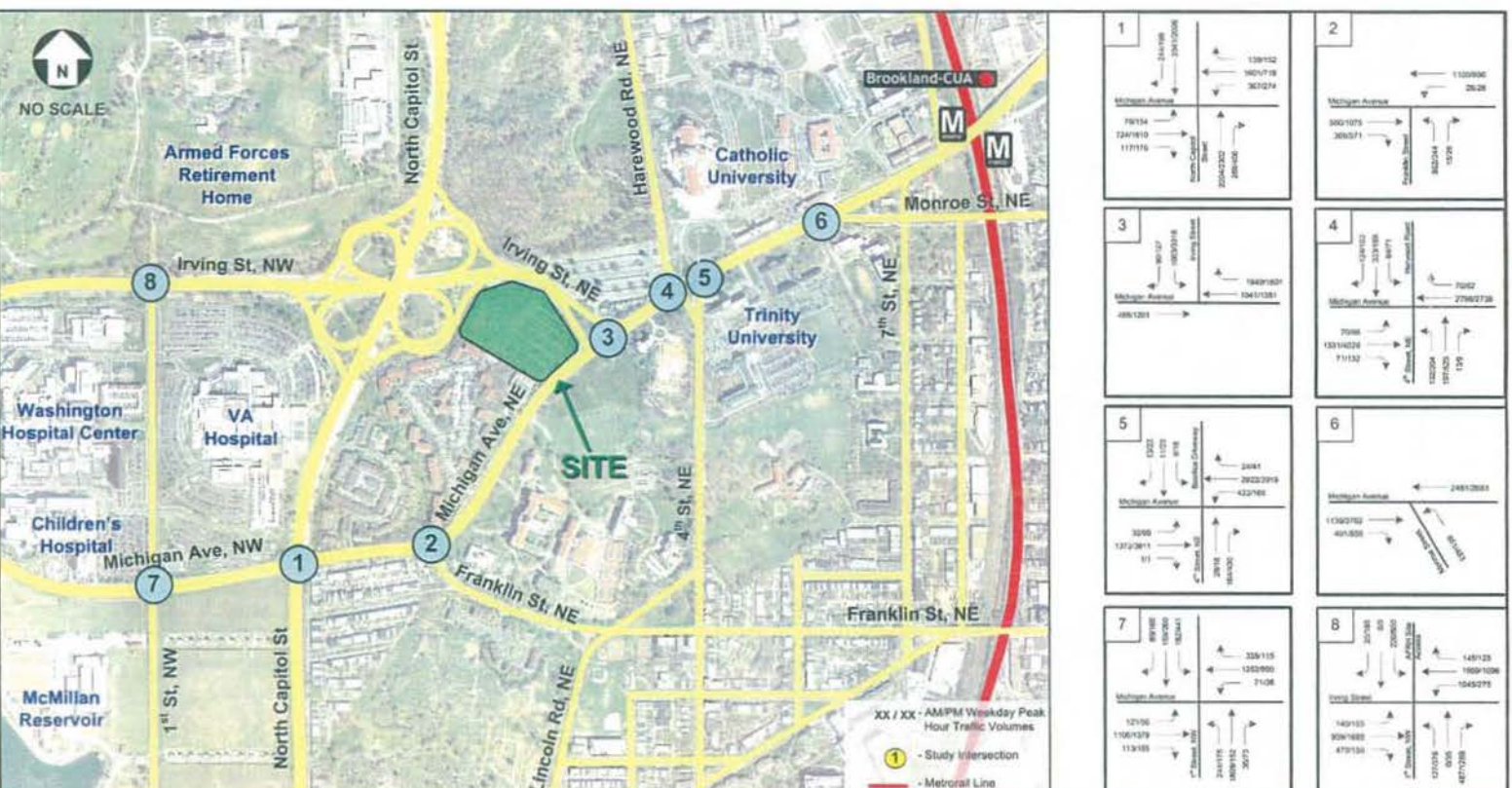


Figure 12 – Total Future Traffic Forecasts

Total Future (2016) Traffic Analyses

Total future peak hour levels of service (including the build out of the subject development) were calculated based on: (1) existing lane use and traffic controls shown on Figure 2; (2) the total future traffic volumes shown on Figure 12; and (3) the *Highway Capacity Manual* 2000 (HCM) methodologies (using Synchro 6 software). Copies of LOS calculation worksheets are included in Appendix D. Table 6 displays the results of the capacity analyses, including LOS and average delay per vehicle (in seconds). Figures 13a and 13b graphically show the LOS results.

The analyses show that under the Total Future (2016) Traffic Conditions (including full-build-out of the proposed development), the majority of the study area intersections would operate at capacity, primarily due to projected heavy commuter peak hour traffic volumes along the major roadways (Michigan Avenue, Irving Street and North Capitol Street). As noted above, the proposed development would generate 245 and 234 additional/new trips during the morning and afternoon peak hours, respectively. These trips would increase study area intersection traffic volumes in the range of 1.5% during the AM and PM peak hours.

It is also noted that the additional site trips would not degrade intersection levels of service or significantly increase average delay beyond what would occur in the future without the development. Therefore, the development in and of itself would have minimal impacts on the study area roadway network.

The Irving Street site access would operate at capacity under the projected future traffic conditions. The Applicant plans to install a traffic signal and provide geometric improvements to address this projected capacity deficiency (see Figure 9).

Table 6 – Total Future Levels of Service

Intersection (Approach)	Total Future Conditions	
	AM Peak Hour Level of Service	PM Peak Hour Level of Service
Michigan Avenue & North Capitol Street		
Overall	F (126.5)	F (155.4)
Eastbound	F (139.4)	F (265.3)
Westbound	F (154.4)	D (48.9)
Northbound	F (124.5)	F (171.6)
Southbound	F (100.7)	F (88.7)
Michigan Avenue & Franklin Street		
Overall	B (13.5)	A (7.2)
Eastbound	A (1.8)	A (1.2)
Westbound	A (6.3)	B (12.4)
Northbound	C (32.9)	C (20.9)
Michigan Avenue & Irving Street		
Overall	C (24.5)	F (196.0)
Eastbound	D (43.4)	F (184.5)
Northbound	A (2.5)	C (23.1)
Southbound	C (21.2)	F (279.0)
Michigan Avenue & Harewood Street		
Overall	F (81.8)	F (315.6)
Eastbound	B (13.6)	F (483.2)
Westbound	F (129.0)	F (139.9)
Northbound	D (45.9)	F (160.9)
Southbound	D (38.2)	C (32.8)
Michigan Avenue & 4 th Street		
Overall	E (62.4)	F (368.8)
Eastbound	C (20.3)	F (483.0)
Westbound	F (81.3)	F (291.7)
Northbound	D (41.5)	F (139.6)
Southbound	C (37.6)	D (35.8)
Michigan Avenue & Monroe Street		
Overall	C (22.2)	F (160.1)
Westbound	D (39.0)	D (43.4)
Northbound	B (17.4)	F (259.4)
Southbound	B (19.5)	B (10.0)
Michigan Avenue & Site Access		
Eastbound Left	B (11.8)	D (31.0)
Southbound Through	D (32.9)	F (253.1)
Irving Street & Site Access		
Overall	A (5.7)	C (20.6)
Northbound Right	D (38.3)	D (38.2)
Eastbound Through	A (3.6)	C (27.7)
Westbound Through	A (5.9)	A (4.3)
Michigan Avenue & First Street		
Overall	F (101.6)	D (54.5)
Eastbound	E (57.4)	B (19.8)
Westbound	C (25.1)	A (6.7)
Northbound	F (272.1)	F (91.5)
Southbound	E (65.8)	F (159.7)
Irving Street & First Street		
Overall	D (43.3)	F (90.8)
Eastbound	D (51.7)	F (102.9)
Westbound	D (44.0)	D (53.7)
Northbound	C (21.2)	F (129.3)
Southbound	D (35.9)	D (45.3)

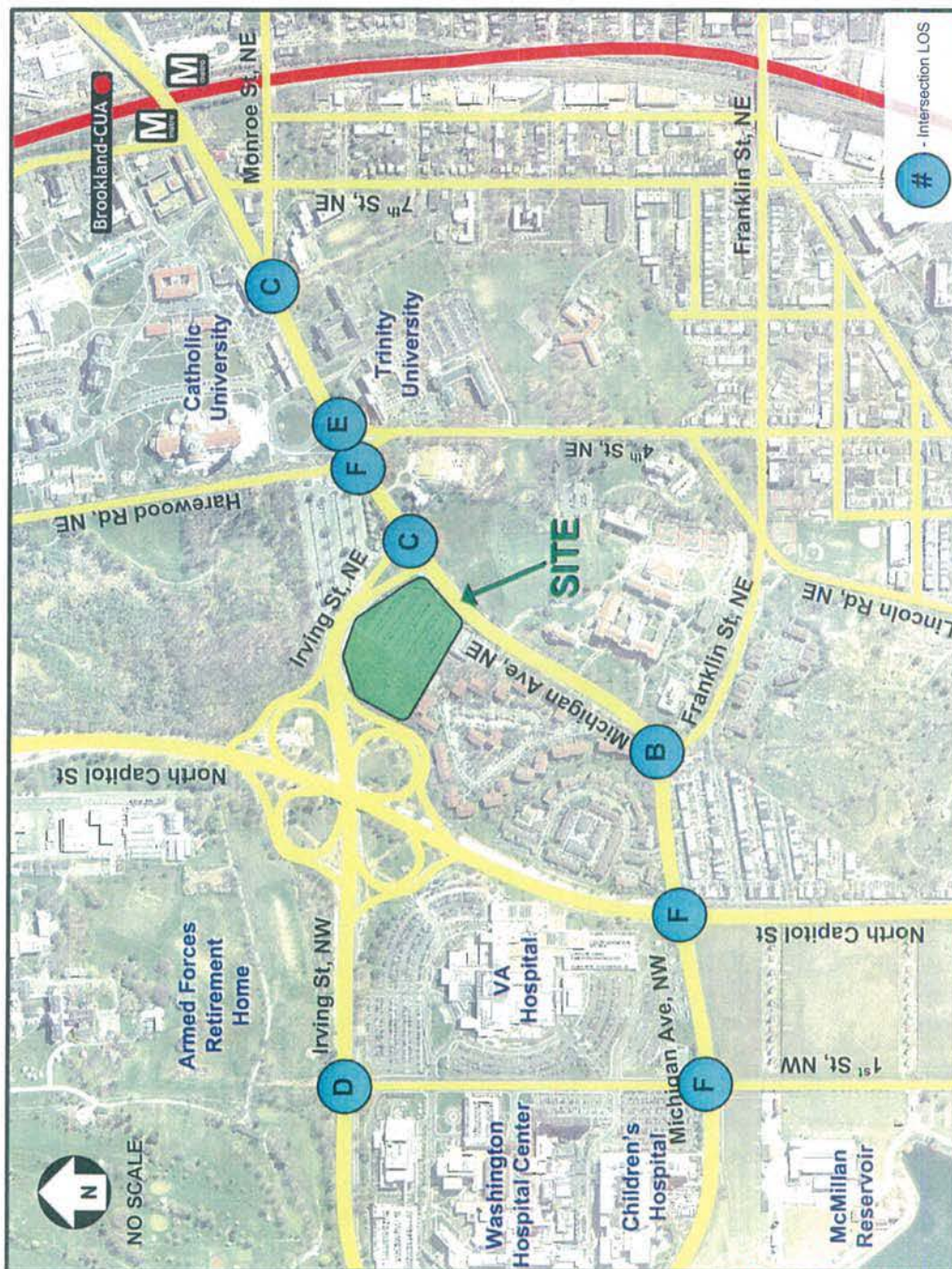


Figure 13a – Total Future Levels of Service - AM Peak Hour

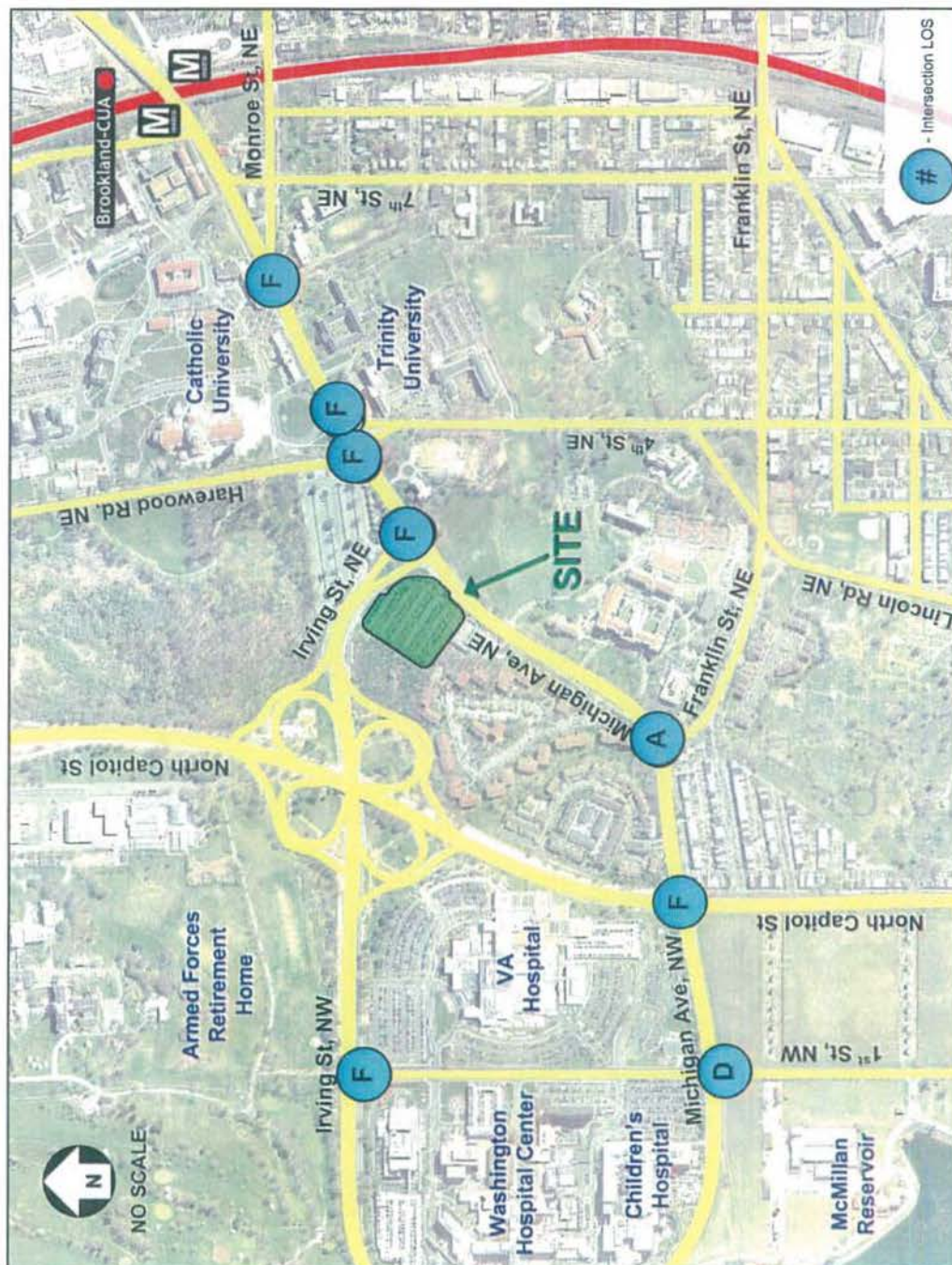


Figure 13b – Total Future Levels of Service - PM Peak Hour



CONCLUSION

The key findings and conclusion of this report as follows:

- a) Under Existing Traffic Conditions, the study area intersections operate at acceptable Levels of Service (i.e., without excessive capacity and delay conditions) during both the morning and afternoon peak hours. The Irving Street site access operates at capacity during the afternoon peak hour.
- b) Under Future (2016) Background Traffic Conditions (i.e., without the proposed development), the majority of the study area intersections would operate at capacity, primarily due to projected heavy commuter peak hour traffic volumes along the major roadways (Michigan Avenue, Irving Street and North Capitol Street). These traffic projections were based on the application of an annual growth rate (1.0%) to existing through/regional traffic until 2016, and consideration of several significant background developments planned for the study area. Review of DDOT Average Annual Daily Traffic (AADT) Maps indicate that traffic volumes have either remained stable, increased marginally or declined over the period 2001 - 2006. This study also notes that the background developments have been the subject of various planning studies over the last 10± years, and their land use programs and build-out timeframes remain uncertain at this time. The Irving Street site access would also operate with capacity constraints.
- c) Under Total Future (2016) Traffic Conditions (including full-build-out of the proposed development), the majority of the study area intersections would operate at capacity, primarily due to projected heavy commuter peak hour traffic volumes along the major roadways (Michigan Avenue and North Capitol Street). The proposed development would generate 245 and 234 additional/new trips during the morning and afternoon peak hours, respectively. These additional trips would increase study area traffic volumes by approximately 1.5% during the morning and afternoon peak hours. It is also noted that the additional site trips would not degrade intersection levels of service or significantly increase average delay beyond what would occur in the future without the development. Therefore, the development in and of itself would have minimal impacts on the study area roadway network.
- d) The Irving Street site access would operate at capacity under the projected future traffic conditions. The Applicant plans to install a traffic signal and provide geometric improvements to address the projected capacity deficiency.
- e) The proposed development would be provided with adequate off-street parking and loading facilities in both development phases. These provisions will satisfy the requirements of the District of Columbia Municipal Regulations.



Based on above, this study concludes that the proposed development could be approved as planned, without having any significant adverse impacts on the surrounding road network and adjacent communities.