WELLS + ASSOCIATES

MEMORANDUM

TO: District of Columbia Zoning Commission

FROM: Jami L. Milanovich, P.E.
Jorjean M. Stanton

DATE: July 8, 2009

COPY: Allan Fye, DDOT
Toby Millman, Abdo Development, LLC
Paul Tummonds, Pillsbury Winthrop Shaw Pittman LLP

RE: CUA South Campus Redevelopment Transportation Impact Study
Washington, D.C.

The Catholic University of America (CUA), in conjunction with Abdo Development, LLC (collectively, the "Applicant") has filed a Planned Unit Development (PUD) application to rezone and redevelop a portion of CUA's campus, known as CUA's South Campus. The six blocks that comprise CUA's South Campus encompass 8.9 acres of land and generally are bounded by Michigan Avenue on the north, Kearney Street on the south, the WMATA/CSX tracks on the east, and the Dominican House of Studies and Theological College on the west in the northeast quadrant of Washington, D.C.

A portion of the 8.9-acre site currently is occupied by three CUA dormitories. As part of the PUD, the site, which currently is located in the R-4, R-5-A, and C-M-1 Zone Districts, would be rezoned. The portions of the site along Michigan Avenue and Monroe Street would be rezoned to the C-2-B District while the properties that are located in the southwest corner of the property (i.e., the location of the townhouses) would be rezoned to the R-5-B District. The small property at the southeast corner of the Monroe Street/8th Street intersection would remain in the C-M-1 Zone District.

The original transportation impact study (TIS) for the site, submitted to the District Department of Transportation (DDOT) on September 8, 2008, evaluated the transportation impacts of the following:

- 865,645 SF of rental residential, condominium residential, and townhouses (or 861 total units);
- 80,680 SF retail; and
- 15,330 SF arts space.

Throughout the evolution of the planning process, the proposed development program has been modified. The current development program consists of the following:

- 820,653 SF of rental residential, condominium residential, and townhouses (or 761 total units);
- 83,073 SF retail; and
- 17,907 SF arts space.

To assess the impact of changes to the original development program, a trip generation analysis was performed under the original development program and under the current development program.

Trip generation methodologies for the modified development program were consistent with the methodologies presented in the TIS dated September 8, 2008. A comparison of the trip generation for the original development program (as shown in the TIS) and the trip generation for the current development program is summarized in Table 1. Details of the trip generation analysis by block are provided in tabular format in Attachment A for both scenarios.

Table 1
Comparison of New External Vehicular Site Trips for CUA Development

DEVELOPMENT PROGRAM	AM PEAK HOUR			PM PEAK HOUR			WEEKDAY DAILY
	In	Out	Total	In	Out	Total	
Current Development Program	123	262	385	208	142	350	4,348
Development Program from September 2008 TIS	123	274	397	224	147	371	4,553
Delta	**0**	**-12**	**-12**	**-16**	**-5**	**-21**	**-205**

As shown in Table 1, the current development program would generate 12 (or three percent) fewer trips than the development program analyzed in the September 2008 traffic study during the AM peak hour. During the PM peak hour, the current development program would generate 21 (or six percent) fewer trips than the development program analyzed in the September 2008 traffic study.

Although the current proposed development program would generate fewer trips than that analyzed in the September 2008 TIS, the Applicant's proposed transportation improvements have remained unchanged. Those improvements are as follows:

- Reconfiguration of the Michigan Avenue/Monroe Street intersection to create a right-angle intersection that would remove the current high speed right turn onto Monroe Street and would reduce the overall speed of traffic along Monroe Street. This reconfiguration also would allow for a significantly safer pedestrian experience in crossing Michigan Avenue,
- Reconfiguration 7th Street at its intersection with Michigan Avenue to align opposite the driveway to CUA. The creation of a true four-legged signalized intersection would create a safer pedestrian and vehicular traffic pattern, and
- Optimization of traffic signal timings at several study intersections.

Additionally, the Applicant has agreed to implement a Transportation Demand Management Program that would include the following:

- Designation of a Transportation Management Coordinator,
- Provision for SmarTrip cards for new residents at the time of initial sales/lease,
- Allotment of a number of parking spaces for car sharing service in the public garage, and
- Provision of available space for a Smart Bike Station on-site.

Should you require any additional information, please do not hesitate to contact us at jlmilanovich@mjwells.com, jmstanton@mjwells.com, or at (724) 933-9010.

Attachment A
Trip Generation Details

Table A-1
CUA Development Trip Generation Summary – Original Development Program

Block	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	Out	Total	In	Out	Total	
Block A-1	**Residential Apartment** (ITE Land Use Code 220) – 303 Dwelling Units							
	Total Site Trips	30	122	152	120	64	184	1,971
	Internal Capture	-	-	-	*6*	*4*	*10*	*153*
	External Site Trips	30	122	152	114	60	174	1,818
	Non-Auto Site Trips (45%)	*14*	*55*	*69*	*51*	*27*	*78*	*818*
	External Vehicular Site Trips	**16**	**67**	**83**	**63**	**33**	**96**	**1,000**
Block A-2	**Residential Townhouse** (ITE Land Use Code 230) – 55 Dwelling Units							
	Total Site Trips	5	27	32	25	12	37	386
	Internal Capture	-	-	-	*1*	*1*	*2*	*30*
	External Site Trips	5	27	32	24	11	35	356
	Non-Auto Site Trips (45%)	*2*	*12*	*14*	*11*	*5*	*16*	*160*
	External Vehicular Site Trips	**3**	**15**	**18**	**13**	**6**	**19**	**196**
Block B	**Residential Condominium** (ITE Land Use Code 230) – 144 Dwelling Units							
	Total Site Trips	12	57	69	54	27	81	875
	Internal Capture	-	-	-	*3*	*2*	*4*	*68*
	External Site Trips	12	57	69	51	25	77	807
	Non-Auto Site Trips (45%)	*5*	*26*	*31*	*23*	*11*	*35*	*363*
	External Vehicular Site Trips	**7**	**31**	**38**	**28**	**14**	**42**	**444**
Block C	**Residential Apartment** (ITE Land Use Code 220) – 152 Dwelling Units							
	Total Site Trips	16	62	78	66	35	101	1,064
	Internal Capture	-	-	-	*3*	*2*	*5*	*83*
	External Site Trips	16	62	78	63	33	96	981
	Non-Auto Site Trips (45%)	*7*	*28*	*35*	*28*	*15*	*43*	*441*
	External Vehicular Site Trips	**9**	**34**	**43**	**35**	**18**	**53**	**540**

Table 1 (continued)
CUA Development Trip Generation Summary – Original Development Program

Block	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	Out	Total	In	Out	Total	
Block E	**Residential Condominium** (ITE Land Use Code 230) – 207 Dwelling Units							
	Total Site Trips	16	76	92	73	36	109	1,191
	Internal Capture	-	-	-	*4*	*2*	*6*	*92*
	External Site Trips	16	76	92	69	34	103	1,099
	Non-Auto Site Trips (45%)	*7*	*34*	*41*	*31*	*15*	*46*	*495*
	External Vehicular Site Trips	**9**	**42**	**51**	**38**	**19**	**57**	**604**
Retail/Arts Block	**Specialty Retail Center**[+] (ITE Land Use Code 814) – 96,010 Square Feet							
	Total Site Trips	170	185	355	111	141	252	4,255
	Internal Capture	-	-	-	*10*	*17*	*27*	*426*
	External Site Trips	170	185	355	101	124	225	3,829
	Non-Auto Site Trips (30%)	*51*	*56*	*107*	*30*	*37*	*68*	*1,149*
	External Vehicular Site Trips	119	129	248	71	87	157	2,680
	Pass-by Site Trips (34%)	*40*	*44*	*84*	*24*	*30*	*53*	*911*
	New External Vehicular Site Trips	**79**	**85**	**164**	**47**	**57**	**104**	**1,769**
Entire Site	**Total CUA Development**							
	Total Site Trips	249	529	778	449	315	764	9,742
	Internal Capture	-	-	-	*27*	*28*	*54*	*852*
	External Site Trips	249	529	778	422	287	710	8,890
	Non-Auto Site Trips	*86*	*211*	*297*	*174*	*110*	*286*	*3,426*
	External Vehicular Site Trips	163	318	481	248	177	424	5,464
	Pass-by Site Trips	*40*	*44*	*84*	*24*	*30*	*53*	*911*
	New External Vehicular Site Trips	**123**	**274**	**397**	**224**	**147**	**371**	**4,553**

[+]AM Peak hour rate based on the PM peak hour rate of the adjacent street divided by the PM peak hour rate of the generator multiplied by the AM peak hour rate of the generator.

Table A-2 (continued)
CUA Development Trip Generation Summary – Modified Development Program

Block	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
Block E	**Residential Condominium** (ITE Land Use Code 230) – 156 Dwelling Units							
	Total Site Trips	13	61	74	58	29	87	937
	Internal Capture	-	-	-	*3*	*2*	*5*	*84*
	External Site Trips	13	61	74	55	27	82	853
	Non-Auto Site Trips (45%)	*6*	*27*	*33*	*25*	*12*	*37*	*384*
	External Vehicular Site Trips	**7**	**34**	**41**	**30**	**15**	**45**	**469**
Retail/Arts Block	**Specialty Retail Center**[+] (ITE Land Use Code 814) – 100,980 Feet							
	Total Site Trips	179	194	373	116	148	264	4,475
	Internal Capture	-	-	-	*10*	*18*	*28*	*447*
	External Site Trips	179	194	373	106	130	236	4,028
	Non-Auto Site Trips (30%)	*54*	*58*	*112*	*32*	*39*	*71*	*1,208*
	External Vehicular Site Trips	125	136	261	74	91	165	2,820
	Pass-by Site Trips (34%)	*43*	*46*	*89*	*25*	*31*	*56*	*959*
	New External Vehicular Site Trips	**82**	**90**	**172**	**49**	**60**	**109**	**1,861**
Entire Site	**Total CUA Development**							
	Total Site Trips	253	506	759	423	307	730	9,445
	Internal Capture	-	-	-	*27*	*28*	*56*	*894*
	External Site Trips	253	506	759	396	279	674	8,551
	Non-Auto Site Trips	*87*	*198*	*285*	*163*	*106*	*268*	*3,244*
	External Vehicular Site Trips	166	308	474	233	173	406	5,307
	Pass-by Site Trips	*43*	*46*	*89*	*25*	*31*	*56*	*959*
	New External Vehicular Site Trips	**123**	**262**	**385**	**208**	**142**	**350**	**4,348**

[+]AM Peak hour rate based on the PM peak hour rate of the adjacent street divided by the PM peak hour rate of the generator multiplied by the AM peak hour rate of the generator.

Table A-2
CUA Development Trip Generation Summary – Modified Development Program

Block	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
Block A-1	**Residential Apartment** (ITE Land Use Code 220) – 308 Dwelling Units							
	Total Site Trips	31	124	155	122	65	187	2,001
	Internal Capture	-	-	-	*7*	*4*	*11*	*180*
	External Site Trips	31	124	155	115	61	176	1,821
	Non-Auto Site Trips (45%)	*14*	*56*	*70*	*52*	*27*	*79*	*819*
	External Vehicular Site Trips	**17**	**68**	**85**	**63**	**34**	**97**	**1,002**
Block A-2	**Residential Townhouse** (ITE Land Use Code 230) – 45 Dwelling Units							
	Total Site Trips	5	22	27	21	10	31	326
	Internal Capture	-	-	-	*1*	*1*	*2*	*29*
	External Site Trips	5	22	27	20	9	29	297
	Non-Auto Site Trips (45%)	*2*	*10*	*12*	*9*	*4*	*13*	*134*
	External Vehicular Site Trips	**3**	**12**	**15**	**11**	**5**	**16**	**163**
Block B	**Residential Condominium** (ITE Land Use Code 230) – 100 Dwelling Units							
	Total Site Trips	9	43	52	40	20	60	642
	Internal Capture	-	-	-	*2*	*1*	*4*	*58*
	External Site Trips	9	43	52	38	19	56	584
	Non-Auto Site Trips (45%)	*4*	*19*	*23*	*17*	*9*	*25*	*263*
	External Vehicular Site Trips	**5**	**24**	**29**	**21**	**10**	**31**	**321**
Block C	**Residential Apartment** (ITE Land Use Code 220) – 152 Dwelling Units							
	Total Site Trips	16	62	78	66	35	101	1,064
	Internal Capture	-	-	-	*4*	*2*	*6*	*96*
	External Site Trips	16	62	78	62	33	95	968
	Non-Auto Site Trips (45%)	*7*	*28*	*35*	*28*	*15*	*43*	*436*
	External Vehicular Site Trips	**9**	**34**	**43**	**34**	**18**	**52**	**532**

CATHOLIC UNIVERSITY OF AMERICA
SOUTH CAMPUS REDEVELOPMENT
TRANSPORTATION IMPACT STUDY
WASHINGTON, D.C.

Prepared by:
Wells & Associates, Inc.

September 2008

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INTRODUCTION

OVERVIEW

The Catholic University of America (CUA), in conjunction with Abdo Development, LLC (collectively, the "Applicant") has filed a Planned Unit Development (PUD) application to rezone and redevelop a portion of CUA's campus, known as CUA's South Campus. The six blocks that comprise CUA's South Campus encompass 8.9 acres of land and generally are bounded by Michigan Avenue on the north, Kearney Street on the south, the WMATA/CSX tracks on the east, and the Dominican House of Studies and Theological College on the west in the northeast quadrant of Washington, D.C. The site location map is shown on Figure 1-1.

The proposal would create a mixed-use development consisting of residential, retail, and arts components and would be interwoven into the existing Brookland Community. As proposed, the 976,942 square foot (SF) development would consist of 875,962 SF of rental residential, condominium residential, and townhouses (or 848 total units); 83,073 SF retail; and 17,907 SF arts space.[1] Access to the site would be provided via 7th Street, 8th Street, Monroe Street, Lawrence Street, and Kearney Street. The proposed site plan for the development is shown on Figure 1-2.

For the purposes of this study, construction of the PUD was assumed to begin in 2009 and be completed by 2015.

STUDY SCOPE

Overview

In order to assess the impacts of the proposed development on the surrounding roadway network, the Applicant commissioned this transportation impact study.

The scope of the study and proposed methodologies were discussed with the District Department of Transportation (DDOT). A summary of the scope of work is included in Appendix A.

Study Area

The study area was selected based on those intersections that potentially could be affected by the proposed development. The following intersections were selected for detailed analysis:

1. Michigan Avenue/Irving Street
2. Michigan Avenue/Harewood Road/4th Street
3. Michigan Avenue/Monroe Street
4. Michigan Avenue/7th Street/CUA
5. Michigan Avenue/John McCormack Road
6. Michigan Avenue/10th Street
7. Monroe Street/7th Street
8. Monroe Street/8th Street
9. Monroe Street/9th Street/WMATA Driveway
10. Franklin Street/7th Street

Study Objectives and Methodology

The objectives of this study were to: (1) evaluate existing transportation conditions, (2) evaluate future (2015) transportation conditions without and with the proposed redevelopment, and (3) identify transportation impacts related to the proposed development.

[1] At the time the analysis was conducted, the development program consisted of 961,655 SF, including 865,645 SF of rental residential, condominium residential, and townhouses (or a total of 861 units); 80,680 SF retail; and 15,330 SF arts space. Because the increase in trips associated with the additional 15,287 SF would represent an increase in trips of approximately one percent (or four trips) during the AM peak hour and no change in the number of trips during the PM peak hour, the change was considered negligible and the analysis of the development program was not updated.

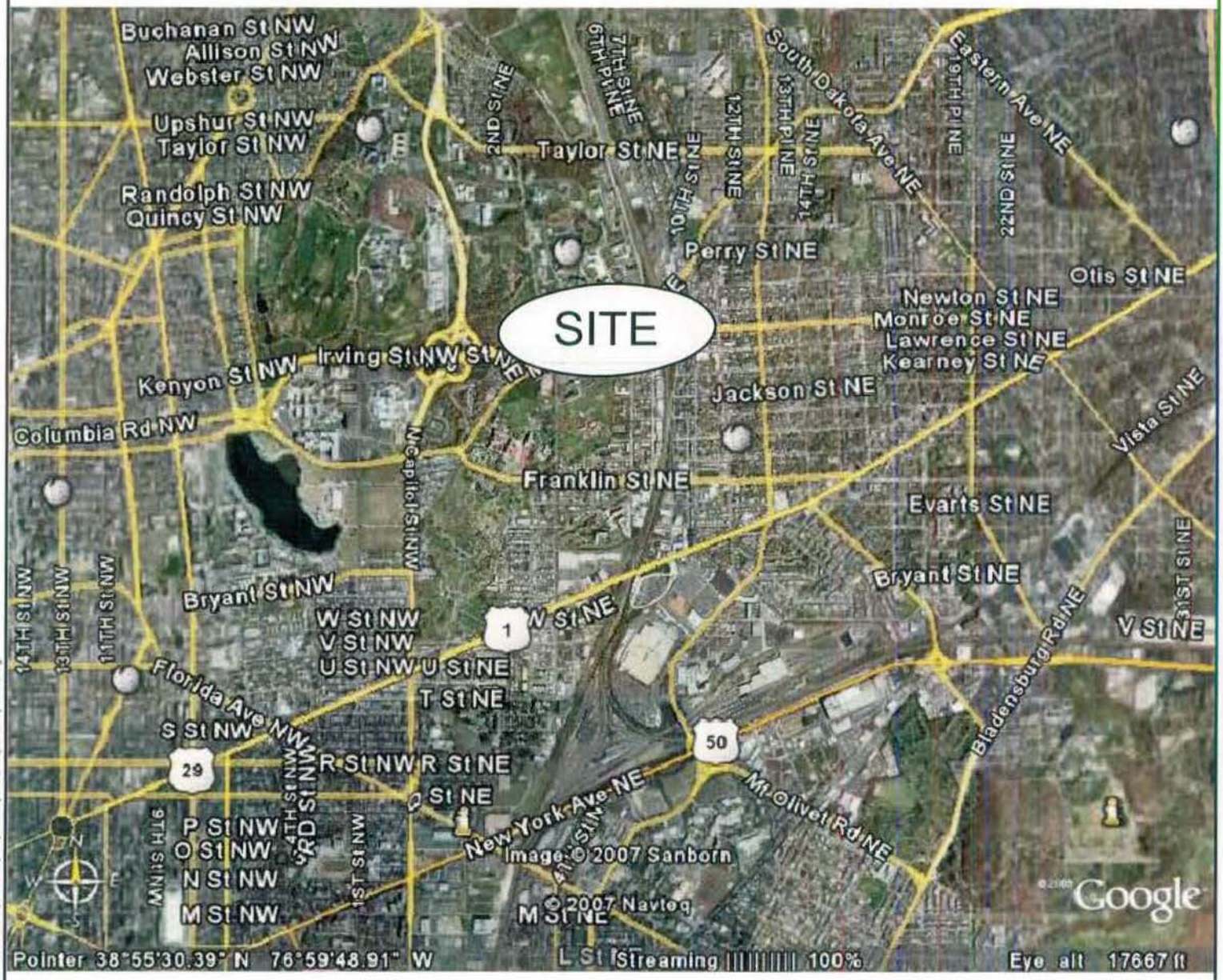

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Figure 1–1
Site Location

North

CUA South Campus
Washington, D.C.

Wells + Associates, Inc.

NOT TO SCALE

Source: Abdo Development, LLC; Torti Gallas and Partners; Maurice Walters Architects

North

Figure 1–2
Reduced Site Plan

Tasks undertaken in this study included the following:

1. Review of development plans provided by Abdo Development.

2. Correspondence with DDOT staff regarding the traffic study scope.

3. A field reconnaissance of existing roadway and intersection geometrics, traffic controls, and speed limits.

4. Turning movement counts at the study intersections during the AM and PM peak periods.

5. Analysis of existing and projected levels of service at the study intersections.

6. Estimation of the number of AM and PM peak hour trips that would be generated by the proposed development and the other planned developments in the area.

7. Recommendation of improvements required to mitigate the impact of the proposed development.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this study are as follows:

1. The CUA South Campus site is proposed to be rezoned from the R-4, R-5-A, and C-M-1 Zone Districts to the C-2-B and R-5-B Zone Districts to accommodate the construction of 875,962 square feet of rental residential, condominium residential, and townhouses; 83,073 square feet of retail space; and 17,907 square feet of arts space.

2. Access to the site would be provided along 7th Street, 8th Street, Monroe Street, Lawrence Street and Kearney Street via multiple driveways to the various areas of the redevelopment.

3. With the existing bicycle and pedestrian systems, the SmartBike and Zipcar systems, and the Metrorail, Metrobus and various shuttle bus systems available in the site vicinity, alternate forms of transportation currently are prevalent in the study area.

4. The proposed redevelopment of the CUA South Campus site would be in conformance with the Brookland-CUA Metro Station Small Area Plan. Additionally, the Applicant plans to construct several of the desired improvements outlined in the Plan, including the realignment of the Michigan Avenue/Monroe Street and Michigan Avenue/7th Street intersections.

5. With the proposed Arts Walk and provision for the accommodation of the future extension of the Metropolitan Branch Trail in Block C of the CUA South Campus site, the proposed development would provide for excellent pedestrian and bicycle connectivity between the section of the Metropolitan Branch Trail on 8th Street with the section north of the Brookland-CUA Metro Station access under the Michigan Avenue bridge. Additionally, the proposed redevelopment would be in conformance with the goals of the draft DDOT Metropolitan Branch Trail Concept Plan.

6. Currently, all study intersections operate at acceptable levels of service (i.e. LOS D or better), with the exception of the following intersections:

   - Michigan Avenue/Harewood Road
   - Michigan Avenue/4th Street
   - Michigan Avenue/Monroe Street (A)
   - Monroe Street/7th Street
   - Monroe Street/8th Street

7. Under background conditions (with pipeline developments), the following intersections have lane groups that would operate deficiently under background conditions:

    - Michigan Avenue/Harewood Road
    - Michigan Avenue/4th Street
    - Michigan Avenue/Monroe Street (A)
    - Michigan Avenue/7th Street/CUA Driveway
    - Michigan Avenue/John McCormack Road
    - Michigan Avenue/10th Street
    - Monroe Street/7th Street
    - Monroe Street/8th Street
    - Franklin Street/7th Street

8. Taking into account internal trips stemming from the synergistic relationship of the uses, the non-auto mode share, and pass-by trips to/from the retail uses, the proposed development would generate an estimated 398 new AM peak hour external vehicle trips and 371 new PM peak hour external vehicle trips.

9. At the majority of the study intersections, the number of trips generated by the proposed redevelopment is expected to account for 1.6 percent to 5.5 percent of the total future traffic forecasts. At the Monroe Street/7th Street intersection, the traffic associated with the redevelopment is expected to account for 15.8 percent to 17 percent of the total future traffic forecasts.

10. According to the parking requirements outlined in the DCMR, 475 on-site parking spaces would be required for the proposed mixed-use development. The proposed development plan would provide 904 parking spaces.

11. As part of the proposed redevelopment, the Applicant is proposing to reconfigure the Michigan Avenue/Monroe Street intersection to create a right-angle intersection that remove the current high speed right turn onto Monroe Street and would reduce the overall speed of traffic along Monroe Street. This reconfiguration also would allow for a significantly safer pedestrian experience in crossing Michigan Avenue.

12. The Applicant also proposes to reconfigure the intersection of 7th Street and Michigan Avenue to align with the entrance to CUA. The creation of a true four-legged intersection at Michigan Avenue and 7th Street will create a safer pedestrian and vehicular traffic pattern.

13. The increase in traffic at the study intersections is expected to have some impact on traffic operations and could be offset by the following additional improvements:

    - Timing improvements at the Michigan Avenue/Harewood Road, Michigan Avenue/4th Street, Michigan Avenue/10th Street, Monroe Street/7th Street, and Franklin Street/7th Street intersections.

14. The Applicant should implement an aggressive TDM program that would encourage residents and tenants to utilize non-SOV (single occupancy vehicle) modes of transportation to and from the site. The TDM program should include the following:

    - Designation of a Transportation Management Coordinator,
    - Provision for SmarTrip cards for new residents at the time of initial sales/lease,
    - Allotment of a number of parking spaces for car sharing service in the public garage, and
    - Establishment of a Smart Bike Station on site.

Section 2
BACKGROUND INFORMATION

EXISTING LAND USE

The subject site is located in Ward 5, which is located in the northeast quadrant of the City, and generally is bounded by Michigan Avenue on the north, Kearney and Lawrence Streets on the south, 7th Street and the WMATA/CSX tracks on the east, and the Dominican House of Studies and Theological College on the west.

A portion of the 8.9-acre site currently is occupied by three CUA dormitories. Currently, the site is zoned R-5-A and R-4 (Residence Districts) and C-M-1 (Commercial-Light Manufacturing District).

The area surrounding the site is comprised of educational, institutional, and residential uses. The Catholic University of America is located to the north of the subject site. The Basilica of the National Shrine of the Immaculate Conception, the Dominican House of Studies, Theological College, and Holy Redeemer College are located to the west of the subject site. St. Paul's College and Trinity College are located to the southwest of the subject site. The Brookland/CUA Metro station is located immediately east of the site, and residential uses are located to the south and east of the site.

BROOKLAND TRANSPORTATION AND STREETSCAPE STUDY

In the Spring of 2006, DDOT initiated a study that focused on comprehensive transportation and streetscape design to enhance safety and strengthen economic development and vitality of the Brookland community.

The goals and objectives of the study were as follows:

- Enhance accessibility, connectivity, and efficiency of different modes of transportation.
- Reduce traffic congestion at key intersections.
- Reduce impact of truck traffic on residential neighborhoods.
- Lay the groundwork for future transportation investments.
- Reinforce a sense of place through creative urban and streetscape design.

The methodology for identifying transportation improvements took into account several key factors such as pedestrian safety, circulation and accessibility; accident history; traffic volumes and intersection levels of service; traffic control devices (i.e., traffic signals, signs, and pavement markings); and truck routes and regulations. The transportation improvements consisted of overall improvements, corridor improvements, and specific intersection improvements which were further divided into short- and long-term recommendations for further consideration by DDOT and the Brookland community.

A few of the overall improvements included:

- Specific recommendations to WMATA to improve the overall mobility within the Brookland community including installation of directional signs at the Brookland/CUA metro station to guide transit riders to key destinations and area attractions; installation of new and expanded bike racks and bike lockers at the metro station; enhancement of pedestrian accessibility to the metro station; and replacement of existing bus shelters with shelters that include appropriate seating,
- Consideration of expanding the Zipcar/Flexcar program within the community to promote car-sharing,

- Installation of updated traffic signal timings with appropriate phasing adjustments to reflect current traffic conditions while improving traffic operations, and
- Installation of pavement markings along on-street parking spaces to better define parking areas and adjacent travel lanes.

Key features for achieving a potential reduction in travel speeds, enhanced pedestrian/bicycle safety, and additional parking along the Monroe Street corridor include bicycle lanes in each direction, provision for additional Zipcar/Flexcar parking spaces, and bulb-outs at the Monroe Street/9th Street intersection.

BROOKLAND-CUA METRO STATION SMALL AREA PLAN

In the Fall of 2006, the Office of Planning initiated a study of the neighborhoods surrounding the Brookland-CUA Metro station, as directed by the Comprehensive Plan. The goal of the study was "to create a redevelopment strategy for areas in and around the Metro station area that will serve as a framework to guide future development."[1]

The Small Area Plan seeks to create a neighborhood civic core and arts infrastructure surrounded by transit-oriented mixed-use development. The Small Area Plan promotes improved overall neighborhood identity, connectivity and walkability, as well as new public spaces and green spaces.

The Small Area Plan divides the areas are under review into four sub-areas. The subject property is located in the Monroe Street Sub-Area. The Small Area Plan notes that the "vision" behind the Monroe Street Sub-Area is to create "Monroe as [a] strong tree-lined urban street with retail, residential and cultural uses, connecting Brookland from east to west and becoming the opportunity for the creation of a Brookland Arts District."[2]

As recommended in the Small Area Plan, the Applicant proposes to reconfigure and reconstruct two intersections in the study area that currently create a dangerous vehicular and pedestrian traffic situation.

The reconfiguration of the Michigan Avenue/Monroe Street intersection will remove the current high speed right turn onto Monroe Street and will reduce the overall speed of traffic along Monroe Street. This reconfiguration also will allow for a significantly safer pedestrian experience in crossing Michigan Avenue.

In addition, the Applicant proposes to reconfigure the intersection of 7th Street and Michigan Avenue to align with the entrance to CUA. The creation of a true four-legged intersection at Michigan Avenue and 7th Street will create a safer pedestrian and vehicular traffic pattern.

Also as recommended in the Small Area Plan, the Applicant plans to signalize the intersection of Monroe Street and 8th Street to better accommodate future traffic volumes and provide a safer environment for pedestrians and bicyclists.

ROADWAY NETWORK

Regional access to the site is provided via Michigan Avenue, Rhode Island Avenue, and North Capitol Street. Monroe Street, Lawrence Street, Kearney Street, 7th Street and 8th Street provide local vehicular access. A description of roadways in the immediate study area is provided below. The existing lane use and traffic control for each study intersection is shown on Figure 2-1.

Michigan Avenue is a four- to six-lane, undivided minor arterial with a posted speed limit of 25 miles per hour (mph) in the vicinity of the site.

The intersections of Michigan Avenue with Irving Street, Harewood Road, 4th Street, Monroe Street, 7th Street, and 10th Street are controlled by traffic signals. Michigan Avenue carries an average daily traffic volume of 36,700 vehicles per day (vpd) in the site vicinity.[3]

Monroe Street is a two- to four-lane minor arterial. The intersections of Monroe Street with Michigan Avenue, 7th Street, and 9th Street are controlled by traffic signals. Monroe Street carries an average daily traffic volume of 14,800 vpd in the site vicinity. [4]

DDOT recently re-striped Monroe Street to accommodate bike lanes on both sides of the street. In order to accommodate the bike lanes, only one travel lane in each direction is present east of 8th Street. West of 8th Street, one travel lane is present in the eastbound direction and two travel lanes are present in the westbound direction. On-street parking is permitted on the south side of Monroe Street. For purposes of this analysis, the current lane configuration was assumed.

Irving Street is a six-lane, median-divided minor arterial with a posted speed limit of 25 mph within the site vicinity. The intersection of Irving Street and Michigan Avenue is controlled by a traffic signal. Irving Street carries an average daily traffic volume of 17,600 vpd.[5]

Harewood Road is a two-lane minor arterial with a posted speed limit of 30 mph within the site vicinity. The Michigan Avenue/Harewood Road intersection is controlled by a traffic signal. Harewood Road carries an average daily traffic volume of 6,400 vpd north of Michigan Avenue.[6]

John McCormack Road is a two-lane collector roadway that ends at an unsignalized T intersection with Michigan Avenue. At this intersection, only inbound traffic from Michigan Avenue can utilize northbound John McCormack Road; southbound John McCormack Road traffic cannot access Michigan Avenue.

4th Street is a four-lane minor arterial with a posted speed limit of 25 mph in the vicinity of the site. The intersections of 4th Street with Michigan Avenue and Harewood Road are controlled by traffic signals. South of Michigan Avenue, 4th Street carries an average daily traffic volume of 14,300 vpd.[7]

7th Street is a two-lane collector roadway with a posted speed limit of 25 mph within the site vicinity. The Franklin Street, Monroe Street, and Michigan Avenue intersections are controlled by traffic signals.

8th Street is a two-lane local roadway. The Monroe Street intersection operates under two-way stop control for 8th Street traffic.

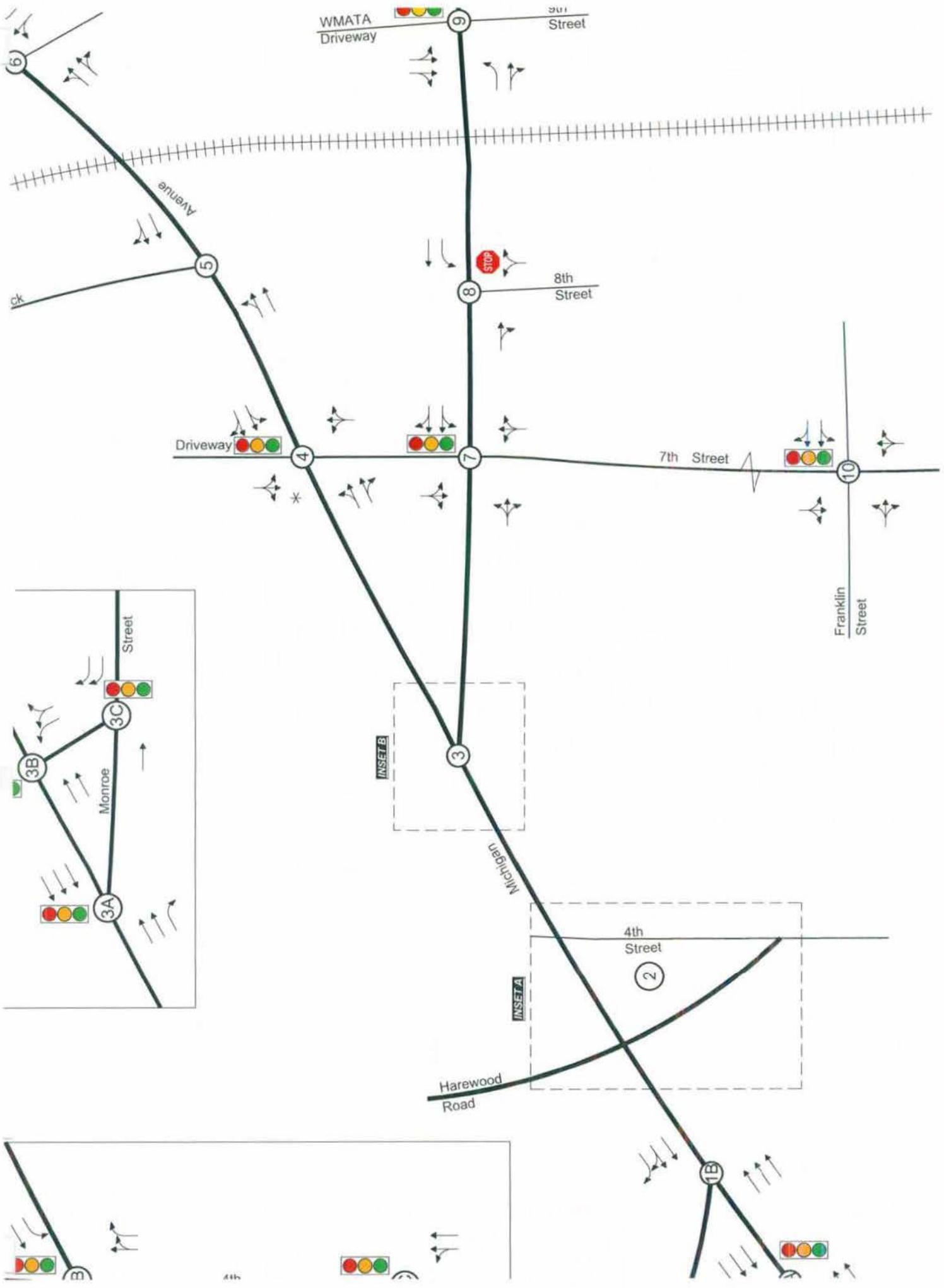
9th Street is a two-lane collector roadway south of Monroe Street. North of Monroe Street, 9th Street serves as an access to the Brookland/CUA Metro Station for authorized vehicles only. The Monroe Street intersection is controlled by a traffic signal.

10th Street is a two-lane local roadway. The Michigan Avenue/10th Street intersection is controlled by a traffic signal.

Franklin Street is a three-lane minor arterial with a 25-mph speed limit in the vicinity of the site. The 7th Street intersection is controlled by a traffic signal. Franklin Street carries an average daily traffic volume of 11,500 vpd in the site vicinity. [8]

Kearney Street is a two-lane local roadway. In the study area, Kearney Street connects 7th and 8th Streets but does not extend beyond those roadways. Kearney Street is stop-controlled at the 7th and 8th Street intersections.

Lawrence Street is a two-lane local roadway. Similar to Kearney Street, in the study area, Lawrence Street connects 7th and 8th Streets but does not extend beyond those roadways. Kearney Street is stop-controlled at the 7th and 8th Street intersections.


WMATA
Driveway
9th
Street
Avenue
ck
8th
Street
Driveway
7th Street
Franklin
Street
INSET B
Michigan
4th
Street
INSET A
Harewood
Road
Street
Monroe
* Currently the south leg of the approach

METROPOLITAN BRANCH TRAIL

The Metropolitan Branch Trail (MBT) is an urban bicycle and pedestrian greenway linking Washington, D.C. with Maryland and a network of regional parks. The Metropolitan Branch Trail is an important recreation and transportation route and provides direct access to seven of Metro's Red Line stations.

The goals of the MBT Concept Plan for this area are summarized below:

- Provide a safe, continuous and visually coherent route through the semi-industrial neighborhood on 8th Street, NE and adjacent to the CUA campus along John McCormack Road;
- Provide strong connections to the Brookland neighborhood at Monroe Street and via the pedestrian underpass at the Brookland-CUA Metro Station;
- Improve access to and from the Brookland-CUA Metro Station; and
- Increase bicycle and pedestrian safety at arterial crossings by using existing and new grade separated facilities and improved at-grade crossings.[9]

Currently, in the site vicinity, the MBT is signed along 8th Street to Monroe Street then along 7th Street to the underpass for the Brookland-CUA Metro Station (i.e., Bunker Hill Road). The MBT then connects to John McCormack Road along the eastern side of the CUA campus.

As shown on Figure 1-2, the proposed development will accommodate the future extension of the MBT along the eastern edge of Block C between the WMATA/CSX tracks and the easternmost residential/art studio building.

DDOT's draft Metropolitan Branch Trail Concept Plan[10] outlines three different options for connecting the MBT along 8th Street to the Brookland-CUA Metro Station access (see Figure 2-2) and to the MBT along John McCormack Road. Each of the three options required a transition from the on-street 8th Street bikeway to an off-road bikeway. The Concept Plan showed that this transition could be provided (1) mid-block on 8th Street between Lawrence Street and Monroe Street; (2) on the west side of the Monroe Street/8th Street intersection; or (3) mid-block on Monroe Street between 7th and 8th Streets.

PEDESTRIAN ROUTES

Within the study area, sidewalks are present along both sides of Michigan Avenue, along both sides of Harewood Road, along both sides of 4th Street north of its intersection with Harewood Road, along both sides of Franklin Street, along both sides of 7th Street, and along both sides of Monroe Street. Pedestrian signals with marked crosswalks are located at the Michigan Avenue/Harewood Road, the Michigan Avenue/4th Street, the Michigan Avenue/10th Street, the Franklin Street/7th Street, the Monroe Street/7th Street, and the Monroe Street/9th Street intersections.

Crosswalks also are present at the following unsignalized intersections:

- Michigan Avenue/John McCormack Road
- Monroe Street/8th Street

Due to the development's proximity to the Brookland-CUA Metro Station, pedestrian accommodations will be essential to the redevelopment of the CUA South Campus. Pedestrian activity will be promoted and facilitated by connecting sidewalks within the proposed development to existing sidewalks along the surrounding roadways. Additionally, the Arts Walk (see Figure 1-2) with art studios and shops on either side, would create a vehicle-restricted, fourth leg to the Monroe Street/8th Street intersection thus providing connectivity for pedestrians and bicyclists between 8th Street and the Brookland-CUA Metro Station access under the Michigan Avenue bridge.

Source: DDOT Metropolitan Branch

PEDESTRIAN MASTER PLAN

The District of Columbia Pedestrian Master Plan strives to make Washington, D.C. safer and more walkable by improving sidewalks, roadway crossings, and the quality of the pedestrian environment as well as by ensuring that the District's policies and procedures support walking.[11] The plan provides an overview of existing pedestrian conditions, recommends new pedestrian projects and programs, establishes performance measures, and provides a plan for implementation through 2018.

The plan estimates areas of pedestrian activity and deficiency. Within the site vicinity, Michigan Avenue contains areas of moderate pedestrian activity and moderate pedestrian deficiency; Monroe Street contains low to moderate pedestrian activity and low to moderate pedestrian deficiency; and 7th Street contains low to moderate pedestrian activity and low to moderate pedestrian deficiency as shown on Figure 2-3.

Additionally, as shown on Figure 2-3, sidewalk deficiencies exist within the site vicinity. Irving Street, Harewood Road, 4th Street, Michigan Avenue, and 8th Street contain stretches of roadway with a sidewalk gap of more than 10 percent of the block length on one side of the road.

The plan provides pedestrian crash data for the years 2000 through 2006. Within the site vicinity, one pedestrian crash has occurred at each the Harewood Road/Michigan Avenue, 7th Street/ Michigan Avenue, and 9th Street/Monroe Street intersections. Two to four pedestrian crashes have occurred at each the Irving Street/Michigan Avenue, Michigan Avenue/Monroe Street, and 7th Street/ Franklin Avenue intersections within the study period.

As part of the plan, eight priority corridors (one in each ward) were identified based on areas of heavy pedestrian traffic and deficient walking conditions. The priority corridor in Ward 5 is Bladensburg Road, NE from Benning Road, NE to Eastern Avenue, NE and, therefore, is outside of the CUA South Campus Redevelopment study area. No specific improvements to roadways in the study area were outlined in the plan.

BICYCLE MASTER PLAN

The District of Columbia Bicycle Master Plan[12] seeks to create a more bicycle-friendly city by establishing high quality bicycle facilities and programs that are safe and convenient.

As part of the plan, under the existing condition of bicyclists sharing the road, the bicycle levels of service (BLOS) in the site vicinity are shown in Table 2-1 and on Figure 2-4.

Table 2-1
Existing Bicycle Levels of Service

Roadway	Bicycle Level of Service
Irving Street	D
Michigan Avenue	D
Harewood Road	C
4th Street	D
Monroe Street	A/D*
John McCormack Road	A
7th Street	C
9th Street	D
LOS A west of 9th Street and LOS D east of 9th Street	

Additionally, the plan reports the number of bicycle crashes that occurred between 2000 and 2002. One bicycle crash occurred at the Michigan Avenue/ Harewood Avenue/4th Street intersection during the study period. No bicycle crashes occurred at any other study intersection during the three-year period.[13]

According to the Bicycle Master Plan,[14] bicycle lanes are proposed on 4th Street and Monroe Street within the site vicinity (see Figure 2-5). During a recent field visit, it was noted that a marked bicycle lane had been added along both sides of Monroe Street within the study area.

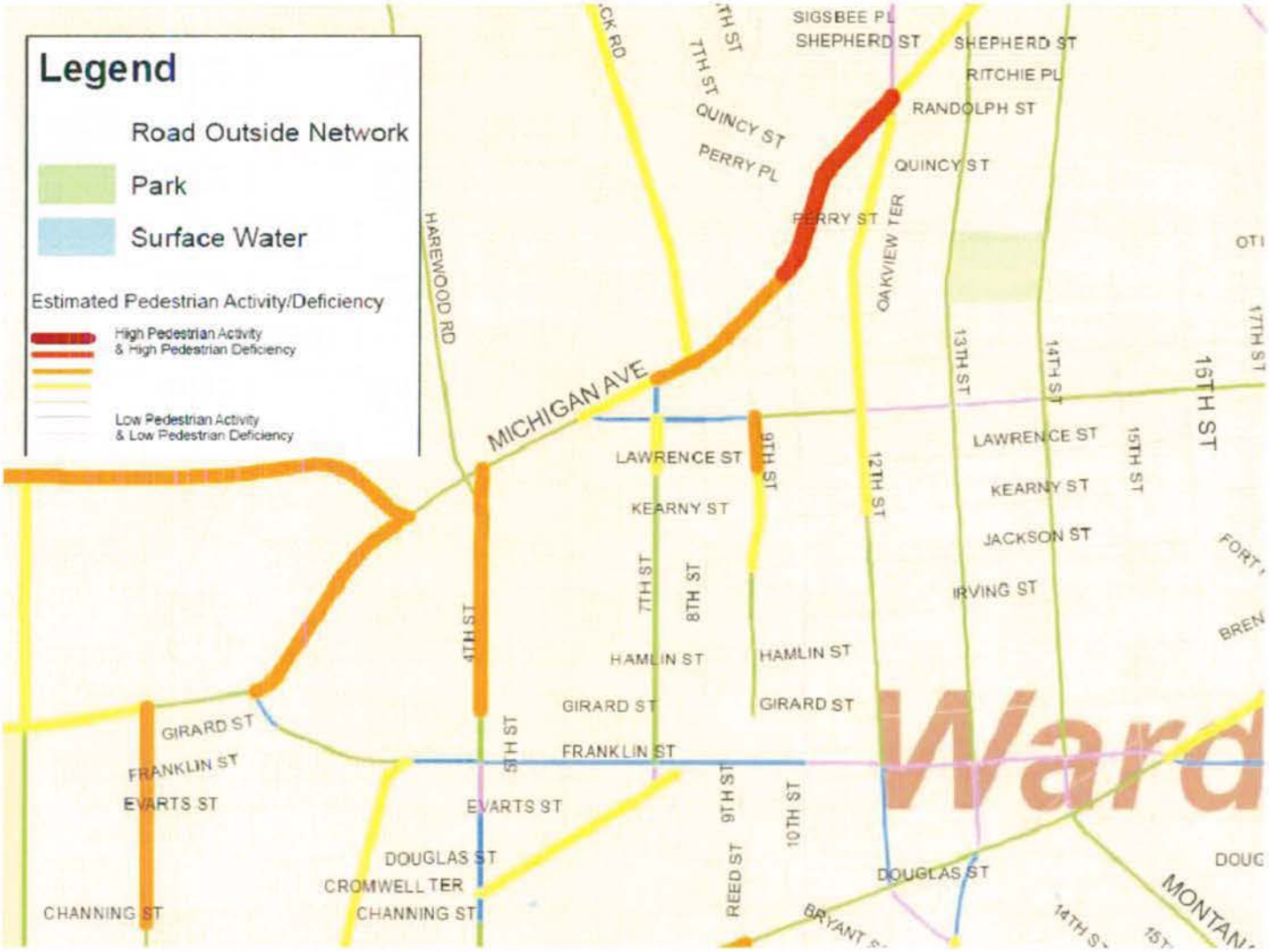


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Figure 2–3
Pedestrian Master Plan

North

CUA South Campus
Washington, D.C.

Wells + Associates, Inc.

Figure 2–4
Bicycle Levels of Service

North

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Figure 2–5
Bicycle Master Plan

North

CUA South Campus
Washington, D.C.

Wells + Associates, Inc.

SMARTBIKE DC

SmartBike is an automated bicycle rental or bicycle sharing system now available in the Washington, D.C. area. Approximately 120 bicycles are available at 10 locations in the greater downtown D.C. area. Currently, the closest SmartBike docking station is located in Shaw on the northwest corner of the 7th Street/T Street, NW intersection, which is approximately 2.2 miles from the CUA South Campus site. However, the Applicant is proposing to include bicycle parking spaces for the SmartBike program in the Arts Walk.

To utilize a SmartBike, a membership must first be purchased online or over the phone (annual membership subscription is $40) and then a membership card is utilized to release a bicycle from the docking station. The bicycle must be returned to any of the 10 docking stations in the City within three hours. The SmartBike system provides a new way of discovering and moving around the city while enhancing the city's public transportation system.

ZIPCAR

Similar to SmartBike, Zipcar is an automated car rental or car sharing system in the Washington, D.C. area. Zipcar users must fill out an application online and then would receive a Zipcard, which enables them to reserve Zipcars at any of the locations. Users pay either an hourly or daily rental fee to utilize the car for their reserved time slot. Cars must be returned to the same designated parking space at which it was picked up.

Two Zipcars are located on the Catholic University campus on Michigan Avenue east of Monroe Street; two Zipcars are located at the Brookland-CUA Metro Station; and two Zipcars are located on Monroe Street between 9th Street and 10th Street in the site vicinity as shown on Figure 2-6.

PUBLIC TRANSPORTATION FACILITIES AND SERVICES

The subject site is located 0.15-mile from the Brookland-CUA Metro Station and approximately 1.1-mile from the Rhode Island Metro Station.

The Red line provides service at both the Brookland-CUA Metro Station and the Rhode Island Metro Station.

The area also is served by several Metrobus routes, as shown on Figure 2-7. The Brookland-Potomac Park Line (Metrobus Route H1), the Crosstown Line (Metrobus Routes H2, H3, and H4), the Brookland-Fort Lincoln Line (Metrobus Route H6), the North Capitol Street Line (Metrobus Route 80), the Park Road-Brookland Line (Metrobus Routes H8 and H9), the Rhode Island Avenue Line (Metrobus Route G8), and the Queens Chapel Road Line (Metrobus Route R4) provide bus service in the study area, as described below.

The Brookland-Potomac Park Line (Metrobus Route H1) provides bus service in the area with a stop located at the intersection of Monroe Street/7th Street. The route provides service to the Brookland-CUA Metro Station, the Columbia Heights Metro Station, the Dupont Circle Metro Station, and the Foggy Bottom-GWU station.

The Crosstown Line (Metrobus Routes H2, H3, and H4) also provides bus service in the area with a stop located at the intersection of Monroe Street/7th Street. Route H2 provides service to the Brookland-CUA Metro Station, the Columbia Heights Metro Station, the Cleveland Park Metro Station, and the Van Ness-UDC Metro Station. Routes H3 and H4 provide service to the Brookland-CUA Metro Station, the Columbia Heights Metro Station, the Cleveland Park Metro Station, and the Tenleytown-AU Metro Station.

The Brookland-Fort Lincoln Line (Metrobus Route H6) provides bus service in the area with a stop located at the Brookland-CUA Metro Station.

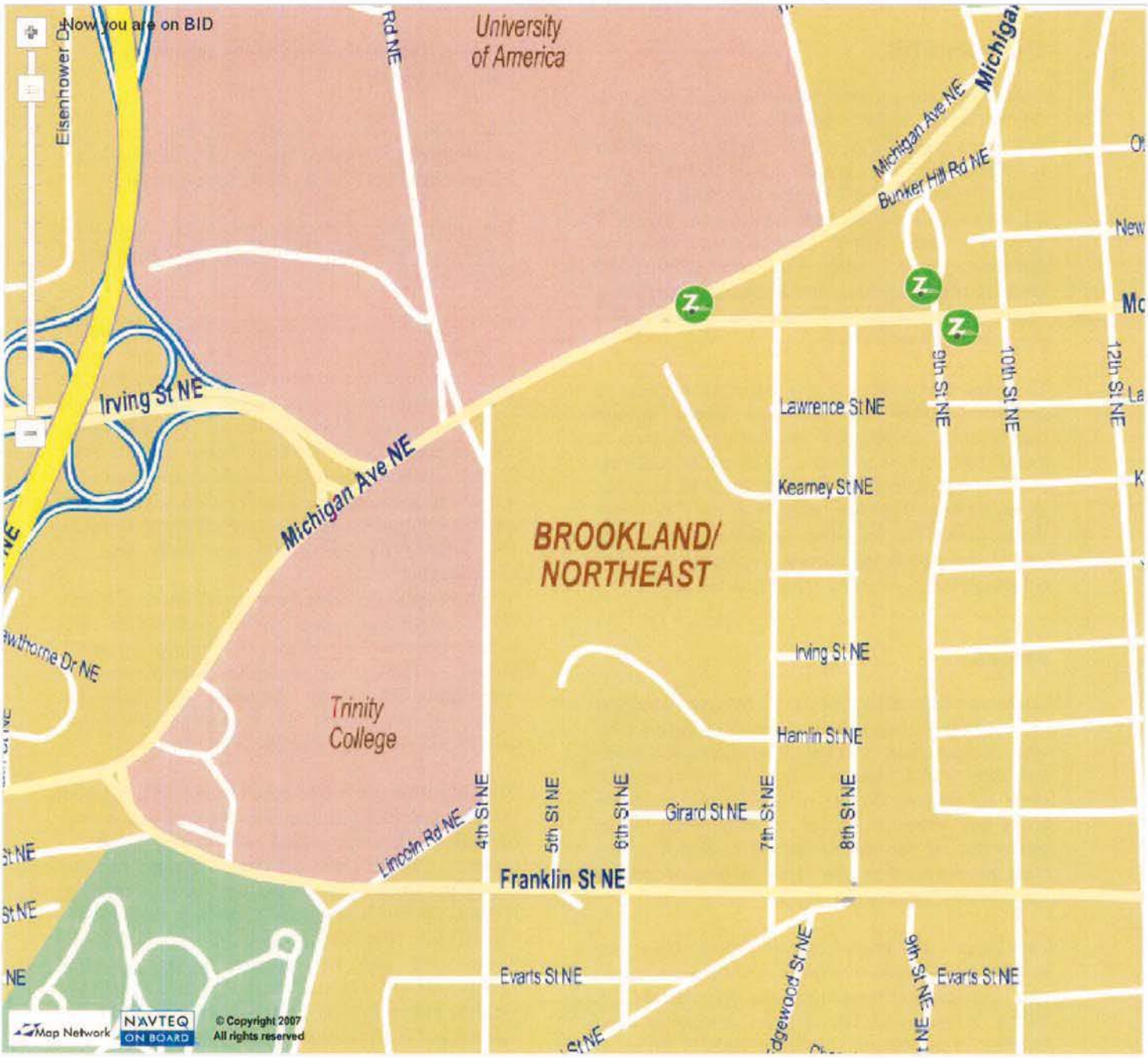

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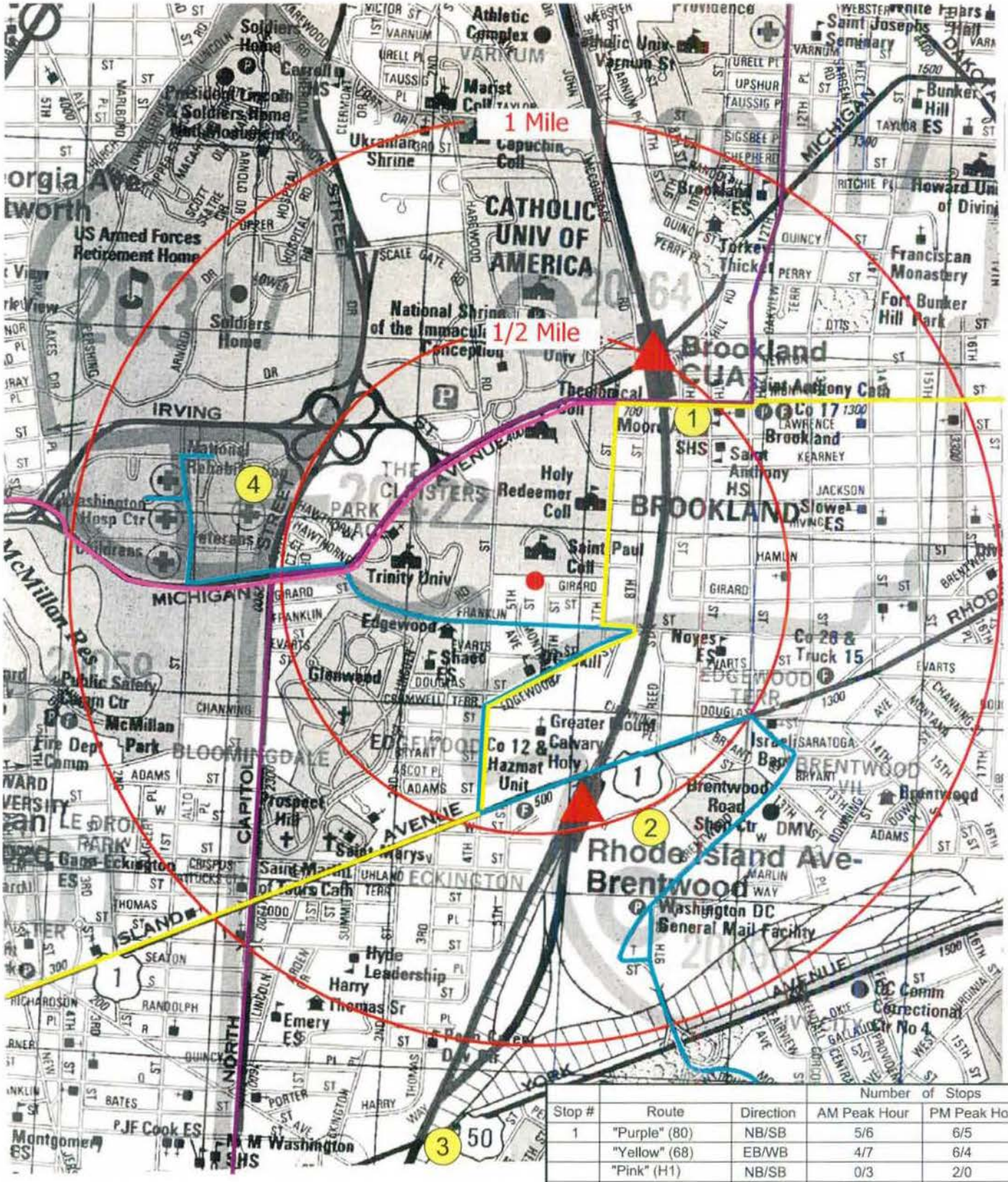
Figure 2–6
Zipcar Locations

North



Stop #	Route	Direction	Number of Stops AM Peak Hour	Number of Stops PM Peak Hour
1	"Purple" (80)	NB/SB	5/6	6/5
	"Yellow" (68)	EB/WB	4/7	6/4
	"Pink" (H1)	NB/SB	0/3	2/0
2	"Light Blue" (D8)	NB/SB	5/5	7/6
3	"Purple" (80)	NB/SB	5/6	6/5
4	"Light Blue" (D8)	NB/SB	5/6	7/5

Figure 2–7
Metrobus Routes

▲ Represents Metrorail Stops

North

CUA South Campus
Washington, D.C.

Wells + Associates, Inc.

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The North Capitol Street Line (Metrobus Route 80) provides bus service in the area with a stop located at the intersection of Monroe Street/7th Street. Route 80 provides service to the Fort Totten Metro Station, the Brookland-CUA Metro Station, the Gallery Place-Chinatown Metro Station, the Metro Center Metro Station, the McPherson Square Metro Station, and the Farragut North and West Metro Stations.

The Park Road-Brookland Line (Metrobus Routes H8 and H9) provides bus service in the area with a stop located at the intersection of Monroe Street/10th Street. Route H8 provides service to the Columbia Heights Metro Station, the Georgia Avenue-Petworth Metro Station, the Brookland-CUA Metro Station, and the Rhode Island Avenue-Brentwood Metro Station. Route H9 provides service to the Brookland-CUA Metro Station, and the Rhode Island Avenue-Brentwood Metro Station.

The Rhode Island Avenue Line (Metrobus Route G8) also provides bus service in the immediate study area. Bus stops are located at the Monroe Street/7th Street and the Monroe Street/8th Street intersections. Route G8 provides service to the Brookland-CUA Metro Station, the Shaw-Howard University Metro Station, the Metro Center Metro Station, and the Farragut North and West Metro Stations.

The Queens Chapel Road Line (Metrobus Route R4) provides bus service in the area with a stop located at the Brookland-CUA Metro Station. Route R4 provides service to the Prince George's Plaza Metro Station, the West Hyattsville Metro Station, and the Brookland-CUA Metro Station.

According to DDOT, plans currently are underway to add a new bus line that would operate in a loop between Brookland and Columbia Heights. It is anticipated that the new bus line would replace several privately operated shuttles. The proposed bus line in expected to be operational by 2011.

RECENT INCREASES IN TRANSIT USE

According to a recent Washington Post article dated June 3, 2008, Americans across the country are turning to public transit because of increasing gas prices. Nationwide, public transit use (streetcars, trolleys and other light rail) has increased an astounding 10.3 percent in the first quarter of the year. Even more significant, transit ridership increased in many areas despite increases in fares; Washington, D.C. being one such area. WMATA experienced its largest ridership increase in history this April (compared to the same time last year), which equated to a 4.3 percent increase.[15]

SHUTTLE BUSES

Several private shuttle bus services operate in the site vicinity. Currently, the shuttle buses drop-off and pick-up passengers under the Michigan Avenue Bridge, east of the railroad tracks, near the Metro Kiss 'n Ride Lot. Shuttles buses leave this area and head west across the Michigan Avenue Bridge to destinations to the west.

The shuttle buses serving the area include:

- ***CUA Shuttle Bus*** provides service for those with a CUA I.D. to various points on campus as well as the Brookland-CUA Metro Station. The service operates Monday through Friday from 4:00 PM until 11:30 PM during the regular academic year. The bus operates on a 15-minute schedule between the athletic center and the library. Additionally, there is a loop bus that operates Sunday through Saturday from 5:00 PM until 12:25 AM during the regular academic year at designated points on campus.

  Also, a Metro A.M. Shuttle operates from 7:30 AM to 9:30 AM at designated locations throughout the campus.

- ***VA Medical Center Shuttle Bus*** provides service between the Brookland-CUA station and the hospital located west of the study area. Departures from the metro station occur between 6:30 AM and 2:00 PM, while departures from the hospital occur between 2:30 PM and 5:30 PM.

- ***The HSC Pediatric Center***, located on Bunker Hill Road, NE, provides shuttle service between the Fort Totten Station, the Brookland-CUA Station, and its business. The shuttle provides service between the Brookland-CUA Station parking lot and the pediatric center between 6:25 AM and 7:15 PM.
- ***Trinity University*** provides a complimentary Metro shuttle to and from the Brookland-CUA Metro station every day from 7:00 AM to midnight with extended hours on Friday and Saturday. The shuttles run every 20 minutes on weekdays and every 30 minutes on Sundays and holidays. A valid University I.D. is required; official guests and visitors for university events may also utilize this service.
- ***Washington Hospital Center***, located on Irving Street west of the study area, provides a Metro shuttle service to and from the Brookland-CUA Metro station on weekdays between 6:00 AM and 8:00 PM. Departure times vary throughout the day.

Based on input from the community, the applicant has identified and will designate an area on the west side of 7th Street, south of Michigan Avenue as a shuttle bus stop. The relocation of the shuttle bus stop from the east side of the tracks to the west side of the tracks will reduce the travel paths of the shuttle buses. With the new stop, shuttle buses heading eastbound on Michigan Avenue would turn right on 7th Street, stop, and then depart by heading south on 7th Street, followed by a right turn on Monroe Street and a left turn back onto Michigan Avenue westbound.

The proposed shuttle bus stop will be temporary until the new bus line proposed by DDOT is operational.

Section 3
EXISTING CONDITIONS ANALYSIS

TRAFFIC VOLUMES

Turning movement, bicycle, and pedestrian counts were conducted at the following intersections on Wednesday, May 21, 2008 from 7:00 AM to 10:00 AM and from 4:00 PM to 7:00 PM:

- Michigan Avenue/Irving Street
- Michigan Avenue/Monroe Street
- Michigan Avenue/7th Street/CUA
- Michigan Avenue/John McCormack Road
- Michigan Avenue/10th Street
- Monroe Street/8th Street
- Monroe Street/9th Street/WMATA Driveway

Turning movement and pedestrian counts from the St. Paul's College Transportation Impact Study (TIS), conducted on Tuesday, March 27, 2007 from 7:00 AM to 10:00 AM and from 4:00 PM to 7:00 PM were used for the following study intersections:

- Michigan Avenue/Harewood Road/4th Street
- Monroe Street/7th Street
- Franklin Street/7th Street

Based on the data collected, a common AM peak hour and a common PM peak hour were selected for the entire study area. The common AM peak hour occurred from 7:45 AM to 8:45 AM and the common PM peak hour occurred from 4:45 PM to 5:45 PM.

Existing traffic volumes at some intersections were adjusted to balance with adjacent intersections with some allowance for driveways located between the intersections. Because the counts conducted in May were taken after classes at CUA were finished, traffic counts at those intersections were factored up to balance with the counts conducted in March.

Peak hour baseline traffic volumes are summarized on Figure 3-1. Peak hour pedestrian counts volumes are summarized on Figure 3-2. Traffic count data are included in Appendix B.

OPERATIONAL ANALYSIS

Capacity/level of service (LOS) analyses were conducted based on the existing lane use and traffic control shown on Figure 2-1, existing vehicular traffic volumes shown on Figure 3-1, existing pedestrian volumes shown on Figure 3-2 and existing DDOT traffic signal timings, which are included in Appendix C.

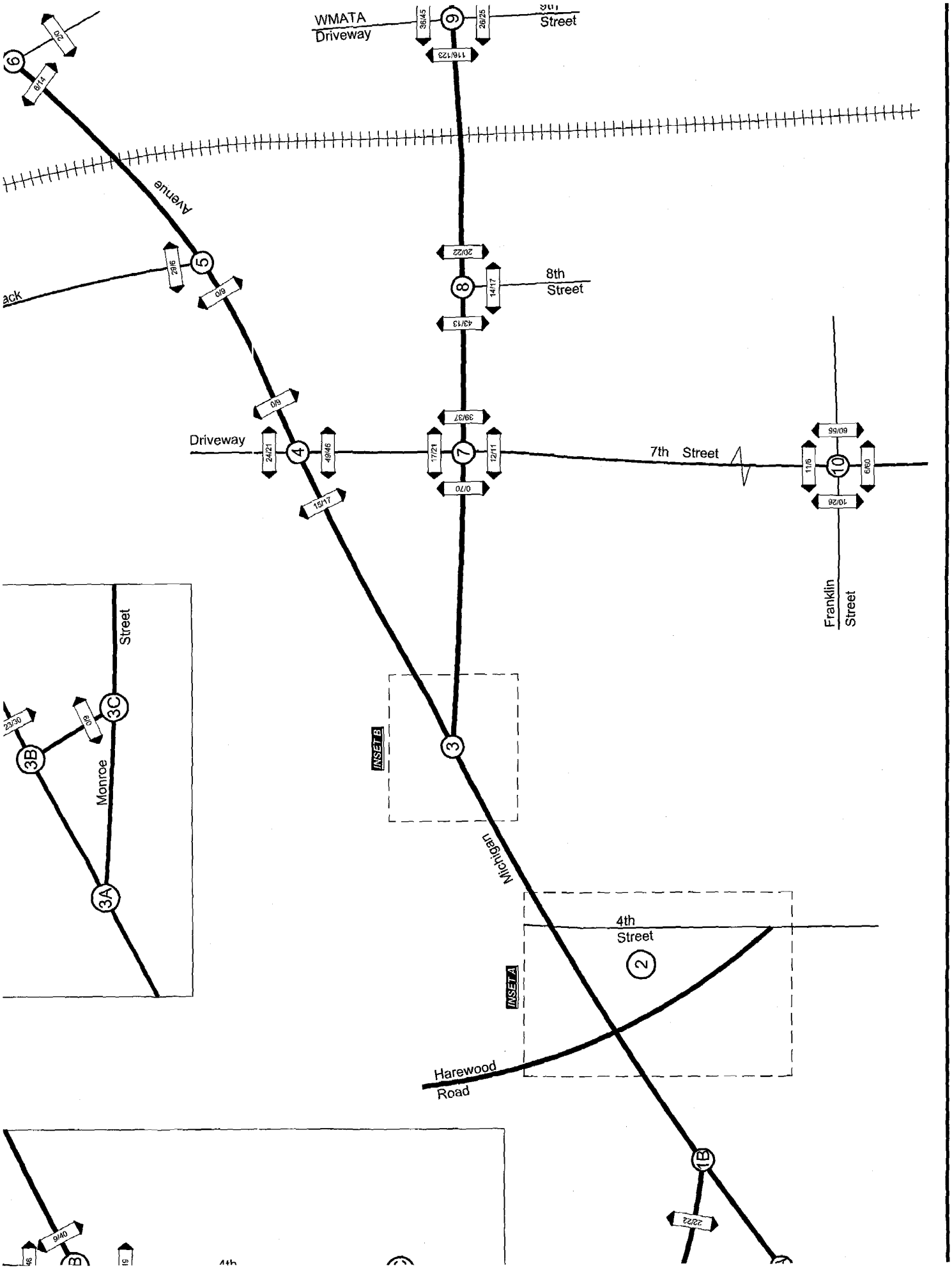
Synchro software (Version 6, Build 614) was used to evaluate levels of service at each of the study intersections during the AM and PM peak hours. Synchro is a macroscopic model used to evaluate the effects of changing intersection geometrics, traffic demands, traffic control, and/or traffic signal settings and to optimize traffic signal timings. The levels of service reported were taken from the Highway Capacity Manual 2000[16] (HCM) reports generated by Synchro. Levels of service descriptions are included in Appendix D.

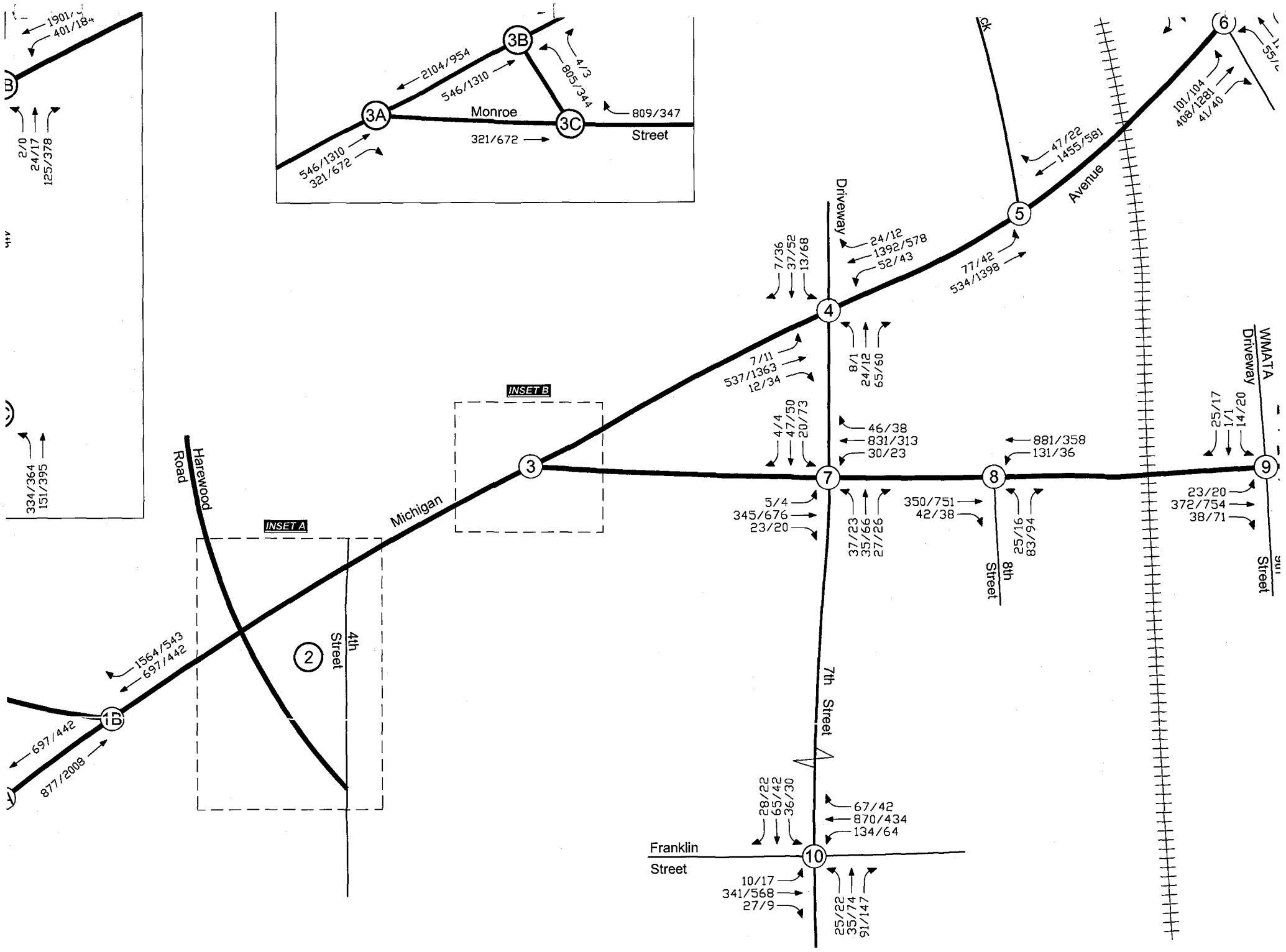
The Synchro results are presented in Appendix E and summarized in Table 3-1.

As shown in Table 3-1, the following intersections currently operate at acceptable levels of service (i.e. LOS D or better) and have additional capacity to accommodate increases in traffic:

- Michigan Avenue/Irving Street SB
- Harewood Road/4th Street
- Michigan Avenue/Monroe Street (B)
- Michigan Avenue/Monroe Street (C)
- Michigan Avenue/7th Street/CUA Driveway
- Michigan Avenue/John McCormack Road
- Michigan Avenue/10th Street
- Monroe Street/9th Street/WMATA Driveway
- Franklin Street/7th Street

Each lane group at these intersections operates at a LOS D or better during both the AM and PM peak hours.


WMATA
Driveway
9th
Street
8th
Street
Driveway
7th Street
Franklin
Street
Avenue
Monroe
Street
Michigan
4th
Street
Harewood
Road
INSET A
INSET B
1B
2
3
3A
3B
3C
4
5
6
7
8
9
10


INSET A
INSET B
3A
3B
3C
Monroe
Street
2104/954
546/1310
321/672
4/3
805/344
809/347
546/1310
321/672
1901/
401/184
2/0
24/17
125/378
334/364
151/395
Harewood
Road
Michigan
Avenue
Driveway
WMATA
Driveway
4th
Street
7th Street
8th
Street
Franklin
Street
1B
2
3
4
5
6
7
8
9
10
1564/543
697/442
697/442
877/2008
7/36
37/52
13/68
24/12
1392/578
52/43
7/11
537/1363
12/34
8/1
24/12
65/60
77/42
534/1398
47/22
1455/581
101/104
408/1281
41/40
4/4
47/50
20/73
46/38
831/313
30/23
881/358
131/36
25/17
1/1
14/20
5/4
345/676
23/20
37/23
35/66
27/26
350/751
42/38
25/16
83/94
23/20
372/754
38/71
28/22
65/42
36/30
67/42
870/434
134/64
10/17
341/568
27/9
25/22
35/74
91/147

As shown in Table 3-1, the following intersections have lane groups that are operating deficiently (i.e., LOS E or F) under existing conditions during at least one of the peak hours:

- Michigan Avenue/Harewood Road
- Michigan Avenue/4th Street
- Michigan Avenue/Monroe Street (A)
- Monroe Street/7th Street
- Monroe Street/8th Street

Table 3-1
Existing Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Irving Street SB		
EBT	B (13.4)	B (17.7)
WBT	B (16.6)	B (15.9)
SBLR	C (20.1)	C (21.2)
Overall	**B (17.0)**	**B (19.2)**
Michigan Avenue/Harewood Road		
EBLTR	D (45.7)	F (150.4)
WBTR	F (147.7)	A (6.5)
NBL	F (122.4)	D (40.5)
NBTR	C (33.1)	C (35.0)
SBLTR	C (34.9)	C (34.7)
SBR	C (28.2)	C (25.6)
Overall	**F (102.2)**	**F (90.6)**
Michigan Avenue/4th Street		
EBLTR	A (5.8)	D (47.8)
WBL	C (34.4)	C (34.0)
WBTR	F (93.0)	B (14.0)
NBTR	C (33.3)	D (40.8)
NBR	B (12.1)	C (24.4)
SBLTR	C (30.5)	C (31.4)
Overall	**E (61.6)**	**D (35.8)**
Harewood Road/4th Street		
EBR	A (0.3)	B (17.0)
NBLT	A (0.8)	A (1.0)
SBT	A (4.3)	A (5.3)
Overall	**A (1.6)**	**A (5.9)**
Michigan Avenue/Monroe Street (A)		
NBT	C (33.3)	C (20.1)
NBR	A (1.4)	E (60.7)
SBT	A (0.2)	A (0.1)
Overall	**A (6.6)**	**C (22.4)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Table 3-1 (continued)
Existing Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Monroe Street (B)		
WBLR	B (17.8)	B (15.3)
NBT	A (0.6)	A (1.3)
SBT	A (8.0)	A (2.9)
Overall	**A (9.6)**	**A (3.9)**
Michigan Avenue/Monroe Street (C)		
EBT	A (3.3)	B (15.9)
WBR	B (17.4)	C (20.9)
Overall	**B (13.4)**	**B (17.6)**
Michigan Avenue/7th Street/ CUA Driveway		
EBLTR	A (2.5)	B (16.4)
WBLTR	A (5.9)	B (13.7)
NBLTR	B (14.4)	A (9.0)
SBLTR	C (26.7)	C (31.7)
Overall	**A (6.0)**	**B (16.8)**
Michigan Avenue/John McCormack Road		
EBLT	B [11.6]	A [1.3]
Michigan Avenue/10th Street		
EBLTR	A (5.2)	A (8.7)
WBTR	B (18.0)	B (13.7)
NBLT	D (45.0)	C (34.4)
NBR	C (29.6)	C (30.0)
SBLTR	D (38.6)	C (33.1)
Overall	**B (19.4)**	**B (15.2)**
Monroe Street/7th Street		
EBLTR	D (35.4)	F (236.1)
WBLTR	F (415.5)	F (104.6)
NBLTR	B (10.4)	A (8.7)
SBLTR	A (8.9)	A (5.3)
Overall	**F (269.2)**	**F (153.0)**
Monroe Street/8th Street		
WBL	A [4.0]	A [3.4]
NBLR	C [19.9]	F [60.7]
Monroe Street/9th Street/ WMATA Driveway		
EBLTR	A (1.9)	B (11.7)
WBLTR	A (8.6)	A (6.5)
NBLTR	D (38.2)	C (30.8)
SBLTR	C (29.3)	C (30.2)
Overall	**A (9.7)**	**B (12.0)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Table 3-1 (continued)
Existing Levels of Service

Approach	AM Peak	PM Peak
Franklin Street/7th Street		
EBLTR	C (25.7)	C (31.6)
WBLTR	B (18.0)	A (9.3)
NBLTR	C (32.4)	D (41.5)
SBLTR	C (31.0)	D (43.9)
Overall	**C (22.4)**	**C (26.5)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Section 4
FUTURE BACKGROUND CONDITIONS

LAND USE

External Pipeline Developments

In addition to the CUA South Campus Redevelopment, six other developments are planned in and around the study area and were considered as part of the background traffic growth.

EYA has filed a Planned Unit Development (PUD) application to develop approximately 10 acres of land on the 20-acre ***St. Paul's College*** campus, generally located east of 4th Street between Hamlin Street and Jackson Street, NE. As proposed, the development would consist of 237 townhouse units. Construction is expected to begin in 2009 and be completed by 2014.

The ***Rhode Island Avenue Gateway*** development is proposed near the intersection of 4th Street and Rhode Island Avenue, NE. The proposed development will consist of a 170-unit residential building with 3,000 SF of ground floor retail. The development is expected to be completed in 2008.

The ***Armed Forces Retirement Home***, generally located in the northwest quadrant of the Irving Street/North Capitol Street intersection, NE, is proposing to lease nearly half of its 272-acre campus to private developers. The first phase of the project, which includes 950,000 SF of office space, 140,000 SF of retail space, a hotel and 77 transitional housing units is anticipated to be completed by 2012. The second phase does not have specific planned land uses but is anticipated to be completed in 2018.

The ***McMillan Sand Filtration Site*** is a 25-acre tract located at the intersection of North Capitol Street and Michigan Avenue, NE. The mixed-use development will consist of 100,000 SF of office space, 40,000 SF of conference space, a 200 room hotel, 100,000 SF of retail space, and an 8,000-SF restaurant. For purposes of this study, the multi-phased project is expected to be completed by 2015.

250 Michigan Avenue, located at the intersection of Michigan Avenue and Irving Street, NE, is a proposed development consisting of a 200 room hotel and 160,000 SF of office space, which also would include a health club and retail stores. The project is expected to be completed by 2015.

Dance Place, located at 3225 8th Street NE, is proposing a new performance hall, rehearsal spaces, studios, classrooms, and 30 to 40 affordable live/work units. The development is expected to be completed by 2011.

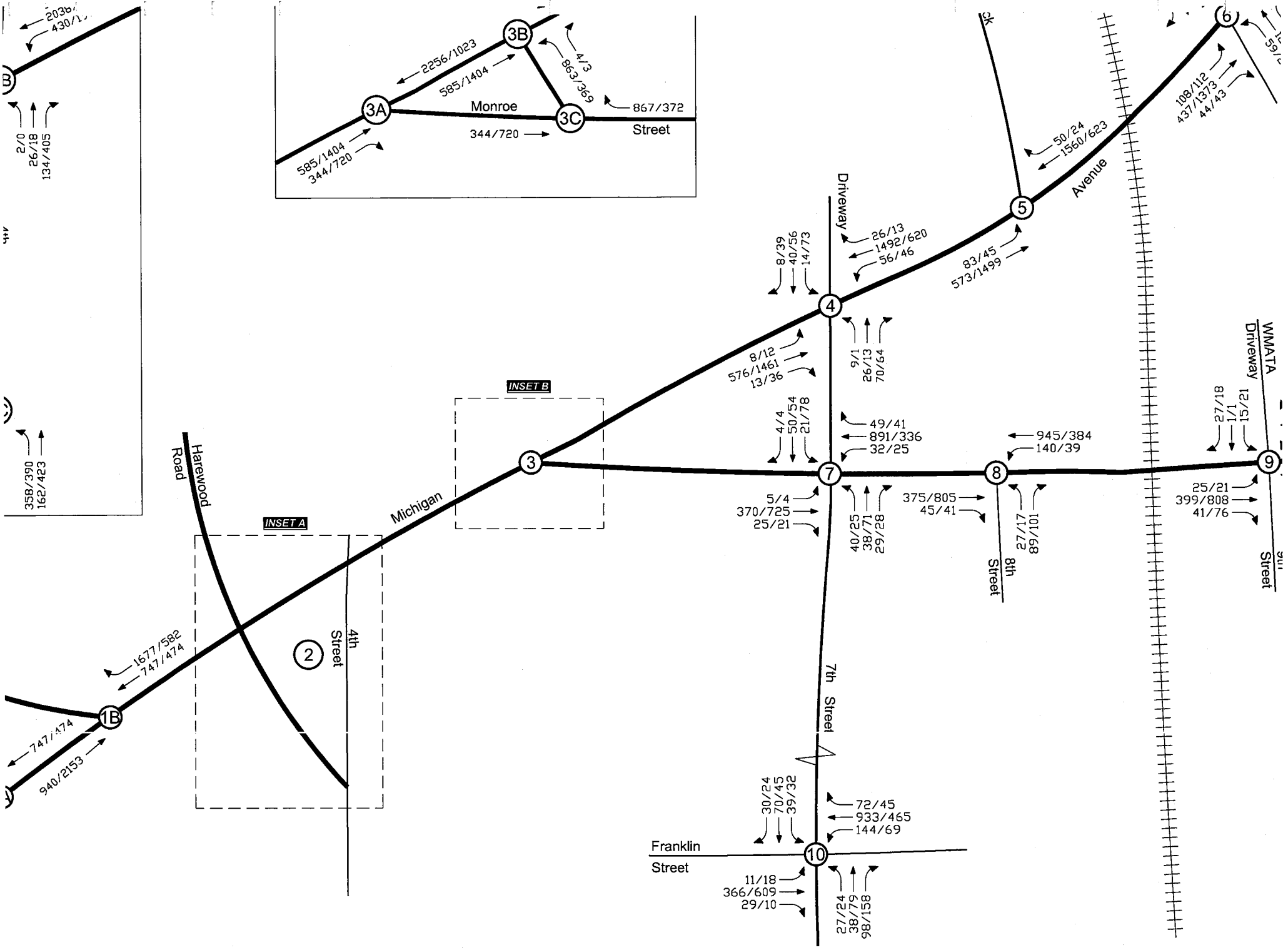
The general location of each pipeline development is shown in Appendix F.

CUA Master Plan

In 2002 the Zoning Commission approved a Master Plan for the CUA campus, which is valid until May 22, 2012. As part of this current Master Plan, CUA would be permitted to increase their enrollment to 7,500 students. The enrollment at the time the Master Plan was completed was 4,357 students; therefore, an additional 3,143 students could be enrolled at CUA under this plan. Since the increased enrollment is approved, the traffic that would be generated by the additional students was assumed in the background analyses. However, CUA has no current plans to increase their enrollment significantly and the inclusion of these additional site trips should be considered conservative for purposes of this analysis.

FUTURE BACKGROUND TRAFFIC FORECASTS

In order to account for regional traffic growth outside the immediate site vicinity, a 1.0 percent growth rate, compounded annually, was applied to the baseline traffic volumes. The resulting volumes are shown on Figure 4-1.


INSET A
INSET B
3A
3B
3C
Monroe
Street
2256/1023
585/1404
344/720
867/372
4/3
863/369
585/1404
344/720
Michigan
Avenue
Harewood
Road
4th
Street
7th
Street
8th
Street
Franklin
Street
WMATA
Driveway
Driveway
1677/582
747/474
747/474
940/2153
358/390
162/423
2/0
26/18
134/405
8/39
40/56
14/73
26/13
1492/620
56/46
8/12
576/1461
13/36
9/1
26/13
70/64
4/4
50/54
21/78
49/41
891/336
32/25
5/4
370/725
25/21
40/25
38/71
29/28
375/805
45/41
945/384
140/39
27/17
89/101
50/24
1560/623
83/45
573/1499
108/112
437/1373
44/43
27/18
1/1
15/21
25/21
399/808
41/76
30/24
70/45
39/32
72/45
933/465
144/69
11/18
366/609
29/10
27/24
38/79
98/158

Additionally, traffic volumes from the various pipeline developments previously described were included in the future traffic forecasts. The number of trips that would be generated by these pipeline developments was estimated based either on the Institute of Transportation Engineers' (ITE) Trip Generation[17] manual or on previously completed traffic impact studies.

A TIS performed by Wells + Associates, LLC was submitted in September 2007 for the ***St. Paul's College*** PUD application; however, because this study analyzed 260 townhouse units, rather than the 237 units now proposed, the trip generation was reevaluated for purposes of this study. Site traffic for the 237 townhouse units was generated based on ITE Land Use Code 230 (Residential Condominiums/ Townhouse) and the resulting trips are shown in Table 4-1. The 35 percent non-auto trip reduction utilized in the previous Wells' study was applied to the total trip generation, as shown in Table 4-1. The distribution and assignment of site trips for the townhouse units also was consistent with the previous Wells' TIS; however, the site trips were carried through the study intersections for this study as needed. The peak hour site trips associated with the St. Paul's College PUD application are included in Appendix F.

The ***Rhode Island Avenue Gateway*** development was included as a pipeline development in the Well's TIS for the St. Paul's College PUD application. Therefore, the trip generation (as shown in Table 4-1) and the distribution and assignment for the Rhode Island Avenue Gateway development were taken directly from that study. The site trips were carried through the study intersections for this study as applicable. The peak hour site trips associated with the Rhode Island Avenue Gateway development are included in Appendix F.

A Final Environmental Impact Statement (FEIS) for the ***Armed Forces Retirement Home*** Master Plan was completed in November 2007 by the Armed Forces Retirement Home in cooperation with the National Capital Planning Commission. The trip generation (as shown in Table 4-1) and the distribution and assignment were taken from the FEIS. There were no common study intersections between the FEIS and this study; therefore, the site trips from the FEIS were extrapolated through the study intersections as needed (see Appendix F). Appropriate documentation from the FEIS also is included in Appendix F.

Site traffic associated with the ***McMillan Sand Filtration Site*** development was generated based on various ITE land uses as detailed in Table 4-1. A non-auto trip reduction was not applied to the trip generation for this site because of its distance (over one mile) to a Metro station. The distribution of site trips for this site was assumed to be the same as the site trip distribution for the retail portion of the CUA site, which is detailed in Section 5 of this study. The ensuing site trip assignment for the McMillan Sand Filtration Site is included in Appendix F.

The trip generation for the development located at ***250 Michigan Avenue*** was developed based on ITE Land Use Codes 710 (General Office) and 310 (Hotel), with a 15 percent non-auto trip reduction for the office component (as shown in Table 4-1). Similar to the McMillan Sand Filtration Site, the distribution of site trips for this site was assumed to be the same as the site trip distribution for the retail portion of the CUA site, which is detailed in Section 5 of this study. The resulting site trip assignment for the 250 Michigan Avenue site is included in Appendix F.

Table 4-1
Pipeline Development Trip Generation Summary

Development	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
St. Paul's College	**Residential Condominium/Townhouse** (ITE Land Use Code 230) – 237 Dwelling Units							
	Total Site Trips	18	85	103	82	40	122	1,337
	Non-Auto Site Trips (35%)	*6*	*30*	*36*	*29*	*14*	*43*	*468*
	Vehicular Site Trips	**12**	**55**	**67**	**53**	**26**	**79**	**869**
Rhode Island Avenue Gateway	**Residential Condominium/Townhouse** (ITE Land Use Code 230) – 170 Dwelling Units							
	Total Site Trips	13	66	79	62	31	93	1,008
	Non-Auto Site Trips (35%)	*5*	*23*	*28*	*22*	*11*	*33*	*353*
	Vehicular Site Trips	8	43	51	40	20	60	655
	Specialty Retail Center[+] (ITE Land Use Code 814) – 3,000 Square Feet							
	Vehicular Site Trips	5	6	11	13	16	29	133
	Total Rhode Island Avenue Gateway Development							
	Total Site Trips	18	72	90	75	47	122	1,141
	Non-Auto Site Trips	*5*	*23*	*28*	*22*	*11*	*33*	*353*
	Vehicular Site Trips	**13**	**49**	**62**	**53**	**36**	**89**	**788**
Armed Forces Retirement Home	**AFRH Master Plan**[++] Office – 950,00 Square Feet Retail – 140,000 Square Feet Hotel Residential – 77 Dwelling Units							
	Vehicular Site Trips	**1,548**	**1,178**	**2,726**	**1,582**	**2,082**	**3,664**	**36,640**

[+] AM Peak hour rate based on the PM peak hour rate of the adjacent street divided by the PM peak hour rate of the generator multiplied by the AM peak hour rate of the generator.

[++] Obtained AM and PM peak hour trips from The Armed Forces Retirement Home Washington Master Plan Final Environmental Impact Statement prepared by Armed Forces Retirement Home, November 2007. The Weekday ADT was calculated by dividing the PM peak hour site trips by 10%.

Table 4-1 (continued)
Pipeline Development Trip Generation Summary

Development	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
McMillan Sand Filtration Site	**General Office Building** (ITE Land Use Code 710) – 100,000 Square Feet							
	Vehicular Site Trips	165	23	188	32	159	191	1,334
	Hotel (ITE Land Use Code 310) – 200 Rooms							
	Vehicular Site Trips	59	38	97	63	55	118	1,634
	Shopping Center (ITE Land Use Code 820) – 100,000 Square Feet							
	Vehicular Site Trips	96	61	157	300	326	626	6,791
	High Turnover Sit-Down Restaurant (ITE Land Use Code 932) – 8,000 Square Feet							
	Vehicular Site Trips	48	44	92	53	34	87	1,017
	Total McMillan Sand Filtration Site Development							
	Vehicular Site Trips	**368**	**166**	**534**	**448**	**574**	**1,022**	**10,776**
250 Michigan Avenue	**General Office Building** (ITE Land Use Code 710) – 160,000 Square Feet							
	Total Site Trips	240	33	273	44	214	258	1,916
	Non-Auto Site Trips (15%)	*36*	*5*	*41*	*7*	*32*	*39*	*287*
	Vehicular Site Trips	204	28	232	37	182	219	1,629
	Hotel (ITE Land Use Code 310) – 200 Rooms							
	Vehicular Site Trips	59	38	97	63	55	118	1,634
	Total 250 Michigan Avenue Development							
	Total Site Trips	299	71	370	107	269	376	3,550
	Non-Auto Site Trips	*36*	*5*	*41*	*7*	*32*	*39*	*287*
	Vehicular Site Trips	**263**	**66**	**329**	**100**	**237**	**337**	**3,263**
Dance Place	**Specialty Retail Center**[+] (ITE Land Use Code 814) – 7,000 Square Feet							
	Vehicular Site Trips	**12**	**14**	**26**	**17**	**21**	**38**	**310**

[+] AM Peak hour rate based on the PM peak hour rate of the adjacent street divided by the PM peak hour rate of the generator multiplied by the AM peak hour rate of the generator.

Table 4-1 (continued)
Pipeline Development Trip Generation Summary

Development	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
Catholic University of America Master Plan	**CUA Master Plan**[§] 3,143 Additional Students							
	Vehicular Site Trips	**341**	**142**	**483**	**256**	**326**	**582**	**5,820**

§ Obtained AM and PM peak hour trips from The Catholic University of America Campus Master Plan Update Traffic Impact Assessment prepared by O.R. George & Associates, Inc., April 2002. The Weekday ADT was calculated by dividing the PM peak hour site trips by 10%.

Specific square footages for the ***Dance Place*** development were not available; therefore, for purposes of this study, ITE Land Use Code 814 (Specialty Retail) was utilized to encompass the unusual variety of land uses in the Dance Place development. The development was assumed to be 7,000 SF since that is the size of the existing warehouse on the site. The trip generation for the Dance Place development is included in Table 4-1 (note that a non-auto reduction was not applied to this development). Again, the retail distributions for the CUA site (detailed in Section 5) were utilized for the site trips associated with Dance Place. The resulting site trip assignment for the Dance Place development is included in Appendix F.

The ***Catholic University of America Campus Master Plan Update*** - Traffic Impact Assessment completed by O.R. George & Associates, Inc. in April 2002 determined that the increase in student enrollment to 7,500 students would result in an additional 483 AM peak hour trips and 582 PM peak hour trips as shown in Table 4-1.[18] The O.R. George study had several study intersections in common with this study; therefore, the site trip assignment for this study were taken directly from the Master Plan study and extrapolated to the remaining study intersections as necessary. The resulting site trip assignment is included in Appendix F.

As previously mentioned, the traffic assignments associated with each of the pipeline developments are included in Appendix F. The combined peak hour site trips associated with the pipelines are shown on Figure 4-2.

The factored traffic volumes shown on Figure 4-1 were combined with the pipeline developments traffic assignments shown on Figure 4-2 to yield the 2015 future background traffic forecasts shown on Figure 4-3.

OPERATIONAL ANALYSIS

Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic control shown on Figure 2-1, future background traffic forecasts shown on Figure 3-3, and existing DDOT traffic signal timings provided in Appendix C.

The Synchro level of service results for the 2015 background conditions without the proposed development are presented in Appendix G and summarized in Table 4-2.

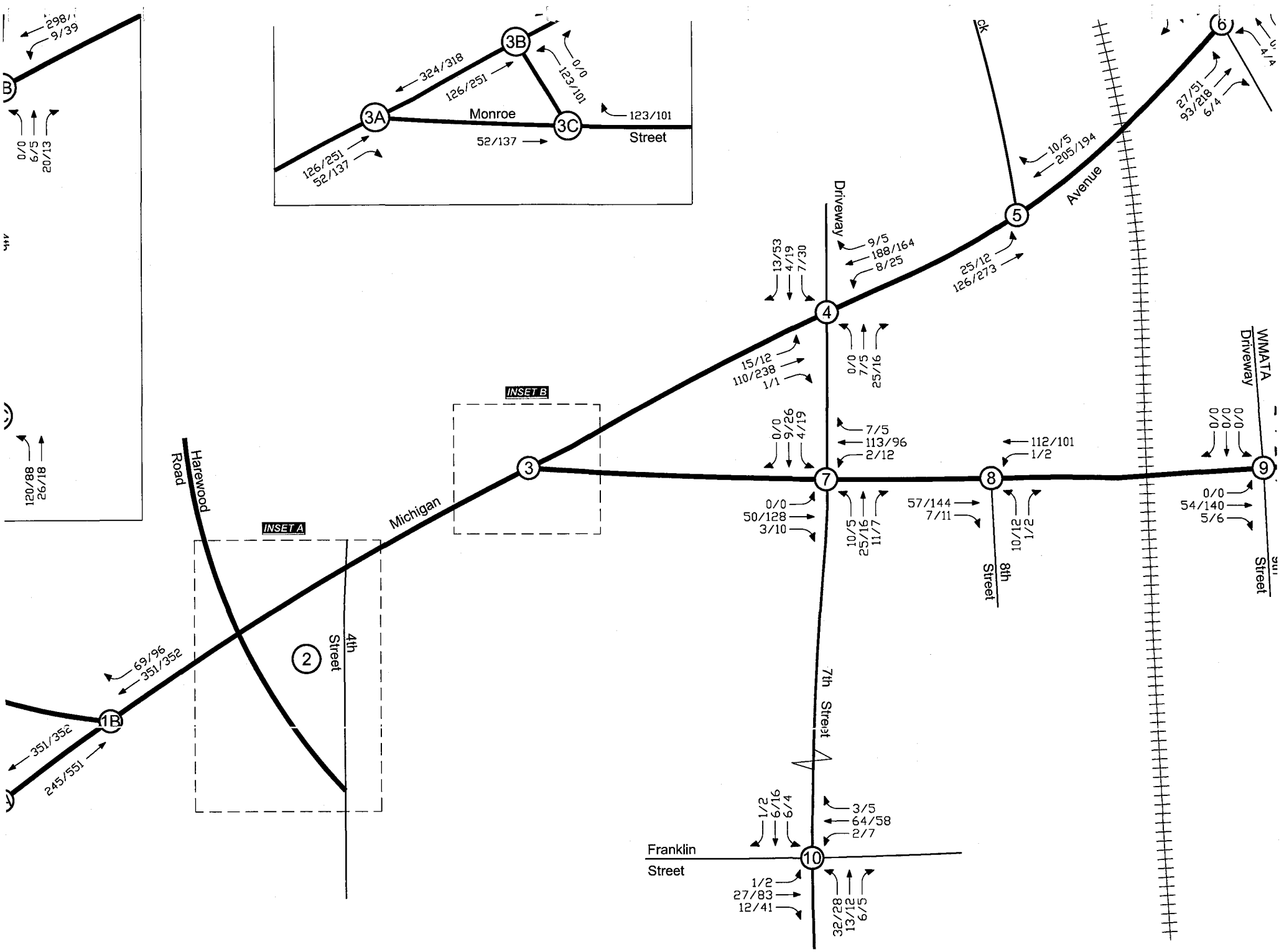
As shown in Table 4-2, the following intersections would operate at acceptable levels of service (i.e. LOS D or better) under background conditions and have additional capacity to accommodate increases in traffic:

- Michigan Avenue/Irving Street SB
- Harewood Road/4th Street
- Michigan Avenue/Monroe Street (B)
- Michigan Avenue/Monroe Street (C)
- Monroe Street/9th Street/WMATA Driveway

Each lane group at these intersections would operate at a LOS D or better during both the AM and PM peak hours.

As shown in Table 4-2, the following intersections would have lane groups that would operate deficiently (i.e., LOS E or F) under 2015 background conditions during at least one of the peak hours:

- Michigan Avenue/Harewood Road
- Michigan Avenue/4th Street
- Michigan Avenue/Monroe Street (A)
- Michigan Avenue/7th Street/CUA Driveway
- Michigan Avenue/John McCormack Road
- Michigan Avenue/10th Street
- Monroe Street/7th Street
- Monroe Street/8th Street
- Franklin Street/7th Street


INSET A
INSET B
Harewood Road
Michigan
4th Street
7th Street
8th Street
WMATA Driveway
Driveway
Avenue
Monroe Street
Franklin Street
1B
2
3
3A
3B
3C
4
5
6
7
8
9
10
298/
9/39
0/0
6/5
20/13
120/88
26/18
324/318
126/251
0/0
123/101
123/101
126/251
52/137
52/137
69/96
351/352
351/352
245/551
13/53
4/19
7/30
9/5
188/164
8/25
25/12
126/273
10/5
205/194
27/51
93/218
6/4
15/12
110/238
1/1
0/0
7/5
25/16
0/0
9/26
4/19
7/5
113/96
2/12
112/101
1/2
0/0
50/128
3/10
10/5
25/16
11/7
57/144
7/11
10/12
1/2
0/0
0/0
0/0
0/0
54/140
5/6
1/2
6/16
6/4
3/5
64/58
2/7
1/2
27/83
12/41
32/28
13/12
6/5

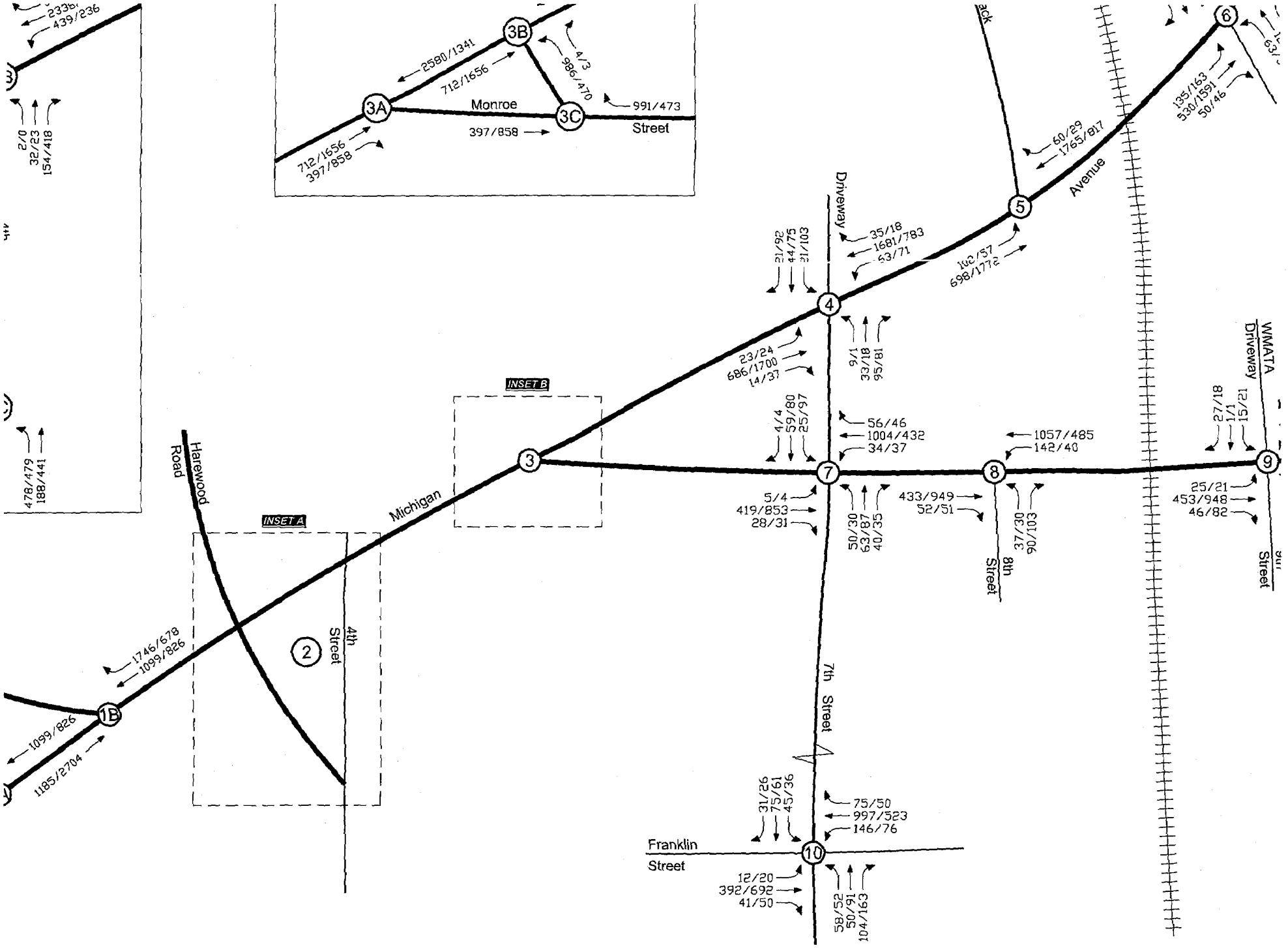

INSET A
INSET B
Monroe
Street
Michigan
Avenue
Harewood
Road
4th
Street
7th
Street
8th
Street
Driveway
WMATA
Driveway
Franklin
Street
1B
2
3
3A
3B
3C
4
5
6
7
8
9
10
2580/1341
712/1656
397/858
991/473
986/470
4/3
60/29
1765/817
35/18
1681/783
43/71
21/92
44/75
21/103
23/24
686/1700
14/37
9/1
33/18
95/81
56/46
1004/432
34/37
1057/485
142/40
4/4
59/80
25/97
5/4
419/853
28/31
50/30
63/87
40/35
433/949
52/51
37/30
90/103
27/18
1/1
15/21
25/21
453/948
46/82
75/50
997/523
146/76
31/26
75/61
45/36
12/20
392/692
41/50
58/52
50/91
104/163
1746/678
1099/826
1185/2704
478/479
188/441
2/0
32/23
154/418
135/163
530/1591
50/46

Table 4-2
2015 Background Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Irving Street SB		
EBT	B (14.3)	C (21.0)
WBT	B (17.6)	C (21.7)
SBLR	C (21.3)	C (23.8)
Overall	**B (17.9)**	**C (22.4)**
Michigan Avenue/Harewood Road		
EBLTR	F (151.3)	F (528.9)
WBTR	F (311.4)	B (10.2)
NBL	F (531.0)	F (153.2)
NBTR	D (35.7)	D (37.0)
SBLTR	D (44.1)	D (45.8)
SBR	C (33.4)	C (33.2)
Overall	**F (232.7)**	**F (295.0)**
Michigan Avenue/4th Street		
EBLTR	A (5.4)	F (212.9)
WBL	E (69.2)	F (84.6)
WBTR	F (211.9)	B (18.6)
NBTR	C (33.3)	D (42.2)
NBR	B (12.9)	C (26.0)
SBLTR	C (32.3)	D (43.0)
Overall	**F (134.3)**	**F (125.2)**
Harewood Road/4th Street		
EBR	A (0.7)	B (17.4)
NBLT	A (1.1)	A (1.3)
SBT	A (3.5)	A (5.1)
Overall	**A (1.6)**	**A (6.7)**
Michigan Avenue/Monroe Street (A)		
NBT	C (34.1)	C (26.8)
NBR	A (2.4)	F (92.3)
SBT	A (0.3)	A (0.1)
Overall	**A (7.2)**	**C (31.4)**
Michigan Avenue/Monroe Street (B)		
WBLR	B (18.3)	B (17.9)
NBT	A (0.9)	A (3.4)
SBT	B (11.9)	A (5.0)
Overall	**B (11.5)**	**A (6.2)**
Michigan Avenue/Monroe Street (C)		
EBT	A (4.0)	C (20.1)
WBR	B (18.2)	C (21.5)
Overall	**B (14.2)**	**C (20.6)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Table 4-2 *(continued)*
2015 Background Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/7th Street/ CUA Driveway		
EBLTR	B (12.8)	C (25.2)
WBLTR	B (10.1)	C (26.9)
NBLTR	B (14.3)	B (12.7)
SBLTR	C (27.6)	E (60.5)
Overall	**B (11.6)**	**C (29.6)**
Michigan Avenue/John McCormack Road		
EBLT	F [94.4]	A [2.2]
Michigan Avenue/10th Street		
EBLTR	B (12.3)	E (79.0)
WBTR	D (48.0)	B (15.0)
NBLT	E (67.6)	D (37.5)
NBR	C (29.7)	C (31.5)
SBLTR	D (43.6)	D (36.0)
Overall	**D (39.7)**	**D (54.9)**
Monroe Street/7th Street		
EBLTR	F (212.2)	F (406.4)
WBLTR	F (163.3)	D (48.1)
NBLTR	A (9.1)	A (8.9)
SBLTR	A (8.1)	A (7.8)
Overall	**F (153.7)**	**F (216.7)**
Monroe Street/8th Street		
WBL	B [10.0]	B [14.0]
NBLR	F [*]	F [269.9]
Monroe Street/9th Street/ WMATA Driveway		
EBLTR	A (2.9)	A (5.7)
WBLTR	A (2.3)	C (25.0)
NBLTR	D (41.5)	A (9.6)
SBLTR	D (48.6)	C (32.3)
Overall	C (29.5)	C (30.5)
Franklin Street/7th Street		
EBLTR	C (30.4)	F (97.3)
WBLTR	C (24.2)	B (10.5)
NBLTR	D (49.2)	E (70.2)
SBLTR	D (35.7)	D (51.9)
Overall	**C (29.8)**	**E (60.4)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

QUEUE ANALYSIS

A queuing analysis was conducted for 2015 conditions without the proposed redevelopment. Synchro was used to conduct the analyses, using the 95th percentile queue lengths. The results are summarized in Table 4-3. Queue reports are provided in Appendix H.

The results of the queuing analysis indicate that queues are projected to extend beyond the available storage for various lane groups at several study intersections under background conditions.

Table 4-3
2015 Background Queue Analyses

INTERSECTION	AVAILABLE STORAGE[3]	2015 BACKGROUND CONDITIONS	
		AM	PM
Michigan Avenue/Irving Street SB			
EBT	1540	97	263
WBT	500	109	175
SBLR	>1000	150	346
Michigan Avenue/Harewood Road			
EBLTR	475	425	1179
WBTR	50	915	410
NBL	100	428	302
NBTR	100	234	282
SBLTR	>1000	280	201
SBR	100	193	170
Michigan Avenue/4th Street			
EBLTR	500	20	21
WBL	800	446	261
WBTR	800	1287	250
NBTR	>1500	61	145
NBR	>1500	61	163
SBLTR	50	57	130
Harewood Road/4th Street			
EBR	100	0	0
NBLT	1400	0	0
SBT	115	17	18

[1] Reported queues are 95th percentile queues from Synchro.
[2] All queues are in feet.
[3] Length of turn lane or distance to nearest major intersection.

Table 4-3 (continued)
2015 Background Queue Analyses

INTERSECTION	AVAILABLE STORAGE[3]	2015 BACKGROUND CONDITIONS	
		AM	PM
Michigan Avenue/Monroe Street (A)			
NBT	700	326	420
NBR	700	3	38
SBT	N/A	0	0
Michigan Avenue/Monroe Street (B)			
WBLR	355	412	227
NBT	N/A	0	0
SBT	330	157	68
Michigan Avenue/Monroe Street (C)			
EBT	135	82	574
WBR	350	139	0
Michigan Avenue/7th Street/CUA Driveway			
EBLTR	340	114	386
WBLTR	1140	88	376
NBLTR	190	31	40
SBLTR	260	78	226
Michigan Avenue/John McCormack Road			
EBLT	220	133	7
Michigan Avenue/10th Street			
EBLTR	1125	317	894
WBTR	270	770	201
NBLT	225	251	186
NBR	165	37	111
SBLTR	235	233	219
Monroe Street/7th Street			
EBLTR	375	603	1180
WBLTR	630	542	266
NBLTR	285	46	63
SBLTR	190	33	59
Monroe Street/8th Street			
WBL	100	16	9
NBLR	295	*	304

[1] Reported queues are 95th percentile queues from Synchro.
[2] All queues are in feet.
[3] Length of turn lane or distance to nearest major intersection.

Table 4-3 (continued)
2015 Background Queue Analyses

Intersection	Available storage[3]	2015 Background Conditions	
		AM	PM
Monroe Street/9th Street/WMATA Driveway			
EBL	100	3	6
EBTR	305	33	477
WBLTR	225	1047	209
NBLTR	285	167	55
SBLTR	N/A	16	12
Franklin Street/7th Street			
EBLTR	590	377	808
WBLTR	1000	306	117
NBLTR	95	176	353
SBLTR	280	104	104

[1] Reported queues are 95th percentile queues from Synchro.
[2] All queues are in feet.
[3] Length of turn lane or distance to nearest major intersection.

Section 5
SITE ANALYSIS

OVERVIEW

The proposed development would consist of 875,962 SF of rental residential, condominium residential, and townhouses (or 848 total units); 83,073 SF retail; and 17,907 SF arts space [3] Access to the site would be provided via 7th Street, 8th Street, Monroe Street, Lawrence Street and Kearney Street.

To accommodate the proposed development, CUA in conjunction with Abdo Development, LLC has filed a PUD application with the District of Columbia Zoning Commission. As part of the PUD, the site, which currently is located in the R-4, R-5-A, and C-M-1 Zone Districts, would be rezoned. The portions of the site along Michigan Avenue and Monroe Street would be rezoned to the C-2-B District while the properties that are located in the southwest corner of the property (i.e., the location of the townhouses) would be rezoned to the R-5-B District. The small property at the southeast corner of the Monroe Street/8th Street intersection would remain in the C-M-1 Zone District.

TRIP GENERATION ANALYSIS

Overview

The total number of trips generated by the proposed development would be comprised of both internal (occurring within the confines of the site) and external trips. Additionally, a portion of the external trips would be made via a mode other than a single-occupant vehicle (i.e., non-auto trips). The trip generation is summarized in Table 5-1 and is described in detail below. Details of the trip generation analysis are provided in tabular format in Appendix I.

Total Trips

The number of trips that would be generated by the proposed mixed-use development was estimated based on the Institute of Transportation Engineers' (ITE) Trip Generation[19] manual. The trip generation was calculated by block numbers and the various land uses as shown in Table 5-1.

Based on standard ITE rates/equations, the proposed mixed-use development would generate a total of 778 AM peak hour trips, 764 PM peak hour trips and 9,742 daily weekday trips.

Internal Trips

A portion of the trips generated by the proposed development would be captured internally within the mixed-use development. By its nature and character of uses, the mixed-use development would experience a naturally occurring synergy. For example, a portion of individual residential trips would utilize the proposed retail uses rather than visiting retail stores outside of the area that would require travel by car. As a result of this naturally occurring synergy, the volume of external trips generated by the site would be reduced.

For purposes of this analysis, the methodology for internal capture rates outlined in the ITE Trip Generation Handbook was used. Internal capture rates are not available for the AM peak hour; therefore, internal trips were estimated only for the PM peak hour and the weekday ADT.[20]

As shown in Table 5-1, during the PM peak hour, 54 trips are estimated to be made internal to the site while on a daily basis 852 trips would be captured internally on the site.

[3] At the time the analysis was conducted, the development program consisted of 961,655 SF, including 865,645 SF of rental residential, condominium residential, and townhouses (or a total of 861 units); 80,680 SF retail; and 15,330 SF arts space. Because the increase in trips associated with the additional 15,287 SF would represent an increase in trips of approximately one percent (or four trips) during the AM peak hour and no change in the number of trips during the PM peak hour, the change was considered negligible and the analysis of the development program was not updated.

Table 5-1
CUA Development Trip Generation Summary

Block	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
Block A-1	**Residential Apartment** (ITE Land Use Code 220) – 303 Dwelling Units							
	Total Site Trips	30	122	152	120	64	184	1,971
	Internal Capture	-	-	-	*6*	*4*	*10*	*153*
	External Site Trips	30	122	152	114	60	174	1,818
	Non-Auto Site Trips (45%)	*14*	*55*	*68*	*51*	*27*	*78*	*818*
	External Vehicular Site Trips	**16**	**67**	**84**	**63**	**33**	**96**	**1,000**
Block A-2	**Residential Townhouse** (ITE Land Use Code 230) – 55 Dwelling Units							
	Total Site Trips	5	27	32	25	12	37	386
	Internal Capture	-	-	-	*1*	*1*	*2*	*30*
	External Site Trips	5	27	32	24	11	35	356
	Non-Auto Site Trips (45%)	*2*	*12*	*14*	*11*	*5*	*16*	*160*
	External Vehicular Site Trips	**3**	**15**	**18**	**13**	**6**	**19**	**196**
Block B	**Residential Condominium** (ITE Land Use Code 230) – 144 Dwelling Units							
	Total Site Trips	12	57	69	54	27	81	875
	Internal Capture	-	-	-	*3*	*2*	*4*	*68*
	External Site Trips	12	57	69	51	25	77	807
	Non-Auto Site Trips (45%)	*5*	*26*	*31*	*23*	*11*	*35*	*363*
	External Vehicular Site Trips	**7**	**31**	**38**	**28**	**14**	**42**	**444**
Block C	**Residential Apartment** (ITE Land Use Code 220) – 152 Dwelling Units							
	Total Site Trips	16	62	78	66	35	101	1,064
	Internal Capture	-	-	-	*3*	*2*	*5*	*83*
	External Site Trips	16	62	78	63	33	96	981
	Non-Auto Site Trips (45%)	*7*	*28*	*35*	*28*	*15*	*43*	*441*
	External Vehicular Site Trips	**9**	**34**	**43**	**35**	**18**	**53**	**540**

Table 5-1
CUA Development Trip Generation Summary

Block	Land Use/Trip Type	AM Peak Hour			PM Peak Hour			Weekday ADT
		In	*Out*	*Total*	*In*	*Out*	*Total*	
Block E	**Residential Condominium** (ITE Land Use Code 230) – 207 Dwelling Units							
	Total Site Trips	16	76	92	73	36	109	1,191
	Internal Capture	-	-	-	*4*	*2*	*6*	*92*
	External Site Trips	16	76	92	69	34	103	1,099
	Non-Auto Site Trips (45%)	*7*	*34*	*41*	*31*	*15*	*46*	*495*
	External Vehicular Site Trips	**9**	**42**	**51**	**38**	**19**	**57**	**604**
Retail/Arts Block	**Specialty Retail Center**[+] (ITE Land Use Code 814) – 96,010 Square Feet							
	Total Site Trips	170	185	355	111	141	252	4,255
	Internal Capture	-	-	-	*10*	*17*	*27*	*426*
	External Site Trips	170	185	355	101	124	225	3,829
	Non-Auto Site Trips (30%)	*51*	*56*	*107*	*30*	*37*	*68*	*1,149*
	External Vehicular Site Trips	119	129	248	71	87	157	2,680
	Pass-by Site Trips (34%)	*40*	*44*	*84*	*24*	*30*	*53*	*911*
	New External Vehicular Site Trips	**79**	**85**	**164**	**47**	**57**	**104**	**1,769**
Entire Site	**Total CUA Development**							
	Total Site Trips	249	529	778	449	315	764	9,742
	Internal Capture	-	-	-	*27*	*28*	*54*	*852*
	External Site Trips	249	529	778	422	287	710	8,890
	Non-Auto Site Trips	*86*	*211*	*296*	*174*	*110*	*286*	*3,426*
	External Vehicular Site Trips	163	318	482	248	177	424	5,464
	Pass-by Site Trips	*40*	*44*	*84*	*24*	*30*	*53*	*911*
	New External Vehicular Site Trips	**123**	**274**	**398**	**224**	**147**	**371**	**4,553**

[+] AM Peak hour rate based on the PM peak hour rate of the adjacent street divided by the PM peak hour rate of the generator multiplied by the AM peak hour rate of the generator.

Non-auto Mode Split

A portion of the trips generated by the proposed mixed-use development would be made via non-auto modes of transportation. The percentage of site-generated trips that would utilize public transportation is dependent on the proximity of the site to transit stops and the degree to which the use of public transit is encouraged, such as by implementation of a transportation demand management (TDM) program.

According to WMATA's 2005 Ridership Survey, the transit mode share is related to the distance from the development to the nearest transit station. Based on the Ridership Survey, the non-auto mode split for the residential uses on the site was estimated to be 44.2 percent. Data from the U.S. Census Bureau,[21] substantiate this estimation. Data from eight census tracts surrounding the subject site indicate that 44 percent of persons currently residing in the study area utilize non-auto modes of transportation to get to work, as shown in Table 5-2.

Table 5-2
U.S. Census Bureau Data
Journey to Work

Transportation Mode	Persons	Percent
	8,509	**100%**
Car, Truck, or Van		
Drove Alone	3,629	42.6%
Carpooled	1,098	12.9%
Total	**4,727**	**56%**
Public Transportation		
Bus	984	11.6%
Streetcar	7	0.1%
Subway	1,678	19.7%
Railroad	49	0.6%
Ferryboat	0	0.0%
Taxicab	84	1.0%
Total	**2,802**	**33%**
Other		
Motorcycle	0	0.0%
Bicycle	27	0.3%
Walked	651	7.7%
Other means	29	0.3%
Stayed Home	273	3.2%
Total	**980**	**11%**

Based on WMATA's 2005 Ridership Survey, the non-auto mode split for the retail portions of the CUA site would be 26.1 percent.

Therefore, as shown in Table 5-1, a 45 percent non-auto reduction was taken for the residential land uses and a 30 percent non-auto reduction was applied for the retail/arts space.

Accordingly, 296 AM peak hour trips, 286 PM peak hour trips and 3,426 daily weekday trips are projected to be made by non-auto modes of transportation, as shown on Table 5-1.

External Vehicle Trips

Taking into account internal trips stemming from the synergistic relationship of the uses and the non-auto mode share, the proposed development would generate an estimated 482 AM peak hour external vehicular trips, 424 PM peak hour external vehicular trips and 5,464 daily weekday external vehicular trips upon build-out, as shown on Table 5-1.

Pass-by Trips

Not all of the external vehicle trips generated by the proposed development are expected to be new trips added to the roadway network. A portion of the trips associated with the retail component would be pass-by trips or trips that are made as intermediate stops on the way to a primary destination. An example of a pass-by trip would be one in which a driver stops at a retail destination on his way home from work.

Typical pass-by trip percentages for various land uses are published by ITE in the Trip Generation Handbook. According to ITE, on average, a pass-by trip rate 34 percent could be expected for the on-site retail uses during the PM peak hour. The 34 percent also was applied to the AM peak hour and the daily weekday trip generation since ITE does not provide specific data for these time periods. Based on the ITE data, the retail/arts space would attract 84 AM peak hour, 53 PM peak hour and 911 daily weekday pass-by site trips.

Accordingly, the proposed development would generate 398 new AM peak hour external vehicle trips, 371 new PM peak hour external vehicle trips and 4,553 new daily weekday external vehicle trips.

SITE TRIP DISTRIBUTION

The distribution of peak hour trips generated by the proposed development was based on existing traffic patterns in the study area and the premise that commuters will select routes that minimize travel time. The distribution of new external vehicular site trips for the residential and retail portions would differ slightly as outlined in Table 5-3. These percentages were utilized for the AM and PM peak hours.

Table 5-3
Distribution of New External Vehicular Site Trips

Roadway	Direction (to/from)	Residential Distribution	Retail Distribution
Michigan Avenue	Southwest	40%	10%
	Northeast	10%	15%
Irving Street	North	10%	15%
Harewood Road	North	0%	10%
4th Street	South	10%	10%
10th Street	North	0%	5%
Monroe Street	East	10%	10%
Franklin Street	West	8%	10%
	East	10%	10%
7th Street	South	2%	5%
TOTAL		100%	100%

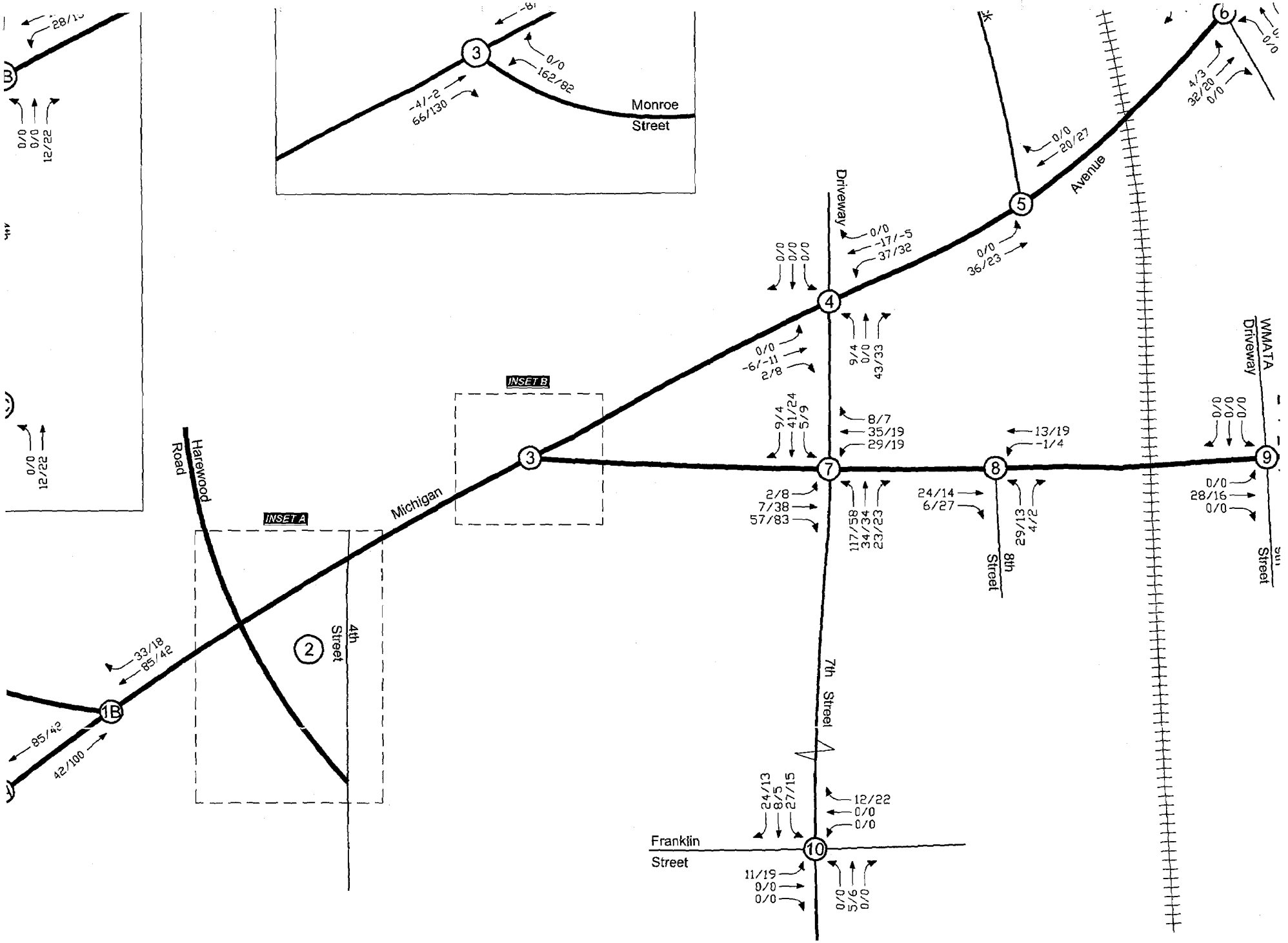
The distribution of the pass-by site trips associated with the retail portion of the proposed development would be different for the AM and PM peak hours as shown in Table 5-4.

Table 5-4
Distribution of Pass-by Site Trips

Roadway	Direction (from)	AM Peak Hour	PM Peak Hour
Michigan Avenue	Southwest	26%	66%
	Northeast	44%	21%
Monroe Street	East	30%	13%
TOTAL		100%	100%

SITE TRAFFIC ASSIGNMENTS

The site-generated traffic volumes were assigned to the public roadway network according to the directional distribution described above. The traffic assignments associated with each of the land uses are included in Appendix I. The resulting site traffic assignments are shown on Figure 5-1.


INSET A
INSET B
Michigan Avenue
Harewood Road
4th Street
7th Street
8th Street
WMATA Driveway
Monroe Street
Franklin Street
Driveway
1B
2
3
4
5
6
7
8
9
10
0/0 0/0 12/22
0/0 12/22
28/16
-4/-2 66/130
0/0 162/82
0/0 20/27
4/3 32/20 0/0
0/0 36/23
0/0 0/0 0/0
0/0 -17/-5 37/32
0/0 -6/-11 2/8
9/4 0/0 43/33
9/4 41/24 5/9
8/7 35/19 29/19
2/8 7/38 57/83
117/58 34/34 23/23
13/19 -1/4
24/14 6/27
81/62 4/22
0/0 0/0 0/0
0/0 28/16 0/0
33/18 85/42
85/42 42/100
24/13 8/5 27/15
12/22 0/0 0/0
11/19 0/0 0/0
5/6 0/0

PARKING REQUIREMENTS

In accordance with the District of Columbia Municipal Regulations (DCMR)[22] and the proposed development plan, Table 5-5, which outlines the number of required and proposed parking spaces by block and land use, was developed. As shown in Table 5-5, the proposed number of spaces exceeds the number required per the DCMR.

Table 5-5
Parking Requirements by Block

BLOCK	ZONING	LAND USE	SIZE	PARKING REQUIREMENT	REQUIRED NUMBER OF PARKING SPACES		PROPOSED NUMBER OF PARKING SPACES
					by use	*by block*	*by block*
A-1	C-2-B	Retail	63,120 SF†	In excess of 3,000 SF, one space for each additional 750 SF	80	183	394
		Residential	308 DUs	One space per 3 DUs	103		
A-2	R-5-B	Residential	45 DUs	One space per 2 DUs	23	23	45
B	C-2-B	Retail	16,390 SF	In excess of 3,000 SF, one space for each additional 750 SF	18	65	139
		Residential	140 DUs	One space per 3 DUs	47		
C	C-2-B	Retail	13,453 SF	In excess of 3,000 SF, one space for each additional 750 SF	14	105	108
		Arts	15,025 SF	In excess of 3,000 SF, one space for each additional 300 SF (all zoning districts)	40		
		Residential	152 DUs	One space per 3 DUs	51		
D	C-M-1	Arts	3,003 SF†	In excess of 3,000 SF, one space for each additional 300 SF (all zoning districts)	1	1	4
E	C-2-B	Retail	23,100 SF	In excess of 3,000 SF, one space for each additional 750 SF	27	98	214
		Residential	214 DUs	One space per 3 DUs	71		
TOTAL CUA SOUTH CAMPUS REDEVELOPMENT PLAN					**475**		**904**

†Includes area of garage that counts in FAR as well as service areas on the G-1 garage/basement level.

Section 6
TOTAL FUTURE CONDITIONS

TOTAL FUTURE TRAFFIC FORECASTS

Total future traffic forecasts with the proposed development were determined by combining the 2015 background traffic forecasts shown in Figure 4-3 with the site traffic volumes shown on Figure 5-1 to yield the 2015 total future traffic forecasts shown on Figure 6-1.

PROPORTIONAL IMPACT ANALYSIS

In order to determine the amount of traffic on the surrounding roadways that is attributable to the proposed redevelopment, a proportional impact assessment was conducted. That is, the total future traffic volumes were compared to the background traffic volumes to determine the impact of adding the site trips to the study intersections. Table 6-1 displays the results of the proportional impact analysis.

Table 6-1
Proportional Impact Analysis

Intersection	AM Peak	PM Peak
Michigan Avenue/Irving Street	5.0%	3.8%
Michigan Avenue/Harewood Road	3.5%	3.3%
Michigan Avenue/4th Street	5.1%	4.7%
Harewood Road/4th Street	2.3%	2.1%
Michigan Avenue/Monroe Street	5.5%	5.1%
Michigan Avenue/Monroe Street	4.3%	2.6%
Michigan Avenue/Monroe Street	5.5%	5.2%
Michigan Avenue/7th Street/CUA Driveway	2.4%	2.0%
Michigan Avenue/John McCormack Road	2.1%	1.8%
Michigan Avenue/10th Street	1.9%	1.6%
Monroe Street/7th Street	17.0%	15.8%
Monroe Street/8th Street	4.0%	4.5%
Monroe Street/9th Street/ WMATA Driveway	2.2%	2.3%
Franklin Street/7th Street	4.1%	4.1%

Site impacts of five percent or less are low and generally reflect negligible effects on traffic operations and delays. Site impacts between five and 15 percent generally are considered moderate and minor effects on traffic operations and delays could be expected. Site impacts of more than 15 percent generally are considered significant.[23]

As shown in Table 6-1, the proportional impact at the majority of the intersections is expected to be insignificant.

OPERATIONAL ANALYSIS

A future conditions capacity analysis, with the proposed development, was performed at the study intersections utilizing 2015 projected total future traffic volumes shown on Figure 6-1 and existing DDOT traffic signal timings included in Appendix C.

The existing lane configuration and traffic controls shown on Figure 2-1 also were utilized for each of the study intersections with the exception of the Monroe Street/7th Street intersection. At this location, the number of westbound through lanes was reduced from two lanes to one lane to reflect the fact that on-street parking along the north side of Monroe Street will be provided in conjunction with the proposed redevelopment. The on-street parking would be provided from just west of the 8th Street intersection to just west of the 7th Street intersection. The presence of the proposed street level retail along Monroe Street will create a vibrant pedestrian atmosphere. The inclusion of on-street parking will assist in creating a pedestrian friendly atmosphere by acting as a buffer between pedestrian activity and the adjacent street.

The analysis is summarized in Table 6-2 and the results are included in Appendix J.

As shown in Table 6-2, under 2015 conditions with the proposed redevelopment, various lane groups at a few study intersections drop from a LOS D or better to a LOS E or F. Additionally, some lane groups that are projected to operate at a LOS F under background conditions are projected to experience an increase in delay of more than 10 percent under total future conditions. The impacted intersections are as follows:

- Michigan Avenue/Harewood Road
- Michigan Avenue/4th Street
- Michigan Avenue/Monroe Street
- Michigan Avenue/John McCormack Road
- Michigan Avenue/10th Street
- Monroe Street/7th Street
- Monroe Street/8th Street
- Franklin Street/7th Street

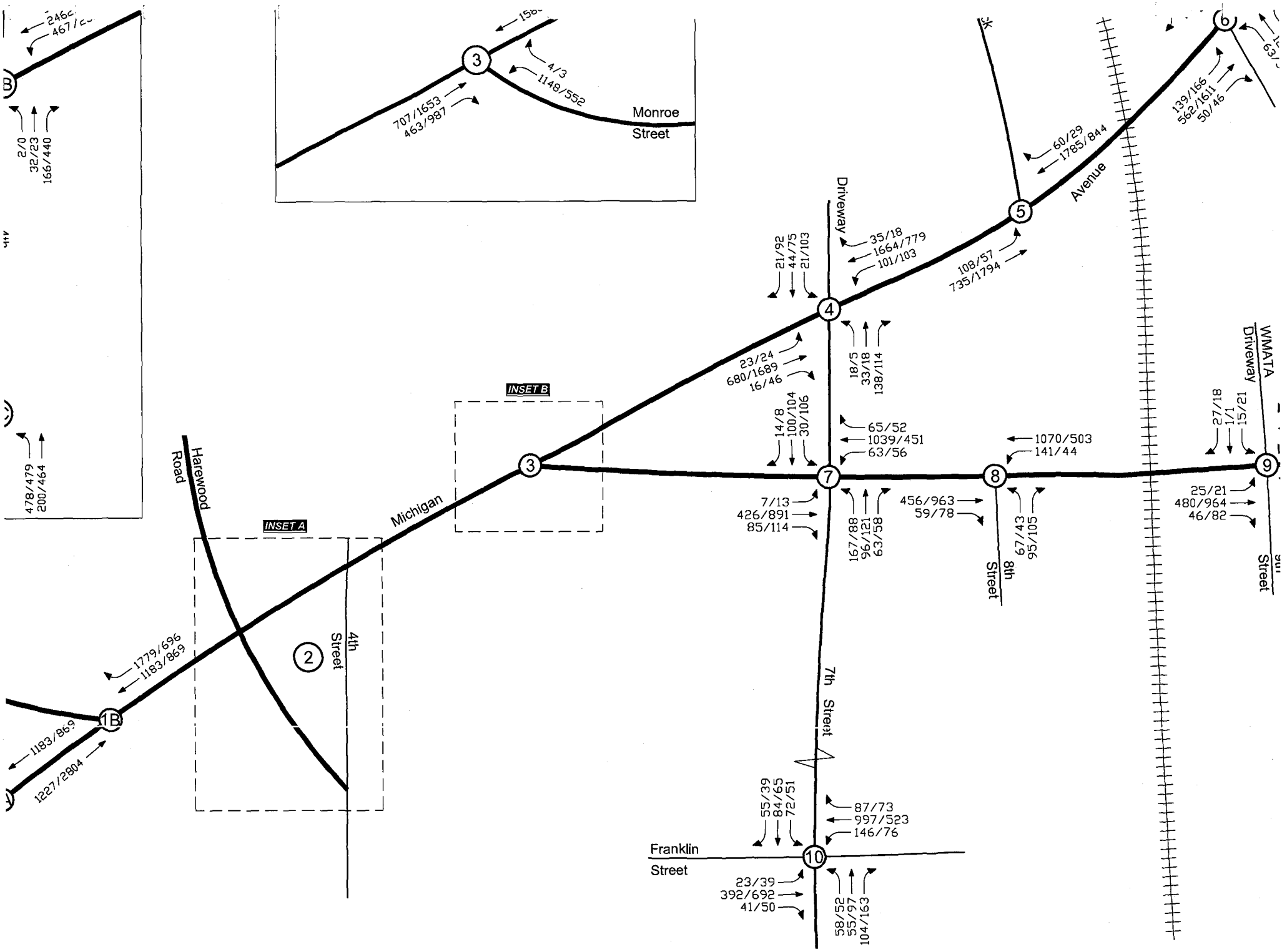

Monroe Street
Driveway
Avenue
WMATA Driveway
Harewood Road
Michigan
4th Street
7th Street
8th Street
Franklin Street
INSET A
INSET B
1B
2
3
4
5
6
7
8
9
10
707/1653
463/987
4/3
1148/552
2/0
32/23
166/440
478/479
200/464
1779/696
1183/869
1227/2804
21/92
44/75
21/103
35/18
1664/779
101/103
60/29
1785/844
108/57
735/1794
139/166
562/1611
50/46
23/24
680/1689
16/46
18/5
33/18
138/114
14/8
100/104
30/106
65/52
1039/451
63/56
1070/503
141/44
27/18
1/1
15/21
7/13
426/891
85/114
167/88
96/121
63/58
456/963
59/78
67/43
95/105
25/21
480/964
46/82
55/39
84/65
72/51
87/73
997/523
146/76
23/39
392/692
41/50
58/52
55/97
104/163

Table 6-2
2015 Total Future Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/Irving Street SB		
EBT	B (14.4)	C (21.6)
WBT	B (18.1)	C (22.6)
SBLR	C (21.4)	C (24.1)
Overall	**B (18.1)**	**C (22.9)**
Michigan Avenue/Harewood Road		
EBLTR	F (171.1)	F (573.8)
WBTR	F (348.8)	B (11.2)
NBL	F (552.4)	F (155.4)
NBTR	D (35.7)	D (36.9)
SBLTR	D (47.3)	D (46.5)
SBR	C (33.4)	C (33.6)
Overall	**F (259.6)**	**F (319.7)**
Michigan Avenue/4th Street		
EBLTR	A (6.1)	F (244.8)
WBL	F (84.3)	F (96.8)
WBTR	F (245.6)	C (21.6)
NBTR	C (33.6)	D (43.5)
NBR	B (13.0)	C (26.7)
SBLTR	C (32.3)	D (44.7)
Overall	**F (155.8)**	**F (143.3)**
Harewood Road/4th Street		
EBR	A (0.9)	B (17.4)
NBLT	A (1.1)	A (1.3)
SBT	A (3.3)	A (4.9)
Overall	**A (1.6)**	**A (6.6)**
Michigan Avenue/Monroe Street (A)		
NBT	C (33.8)	C (26.6)
NBR	A (2.7)	F (120.4)
SBT	A (0.3)	A (0.2)
Overall	**A (6.8)**	**D (39.2)**
Michigan Avenue/Monroe Street (B)		
WBLR	C (22.1)	B (18.2)
NBT	A (0.9)	A (3.4)
SBT	B (12.1)	A (6.0)
Overall	**B (13.2)**	**A (6.8)**
Michigan Avenue/Monroe Street (C)		
EBT	A (4.3)	C (27.3)
WBR	B (18.9)	C (21.6)
Overall	**B (14.8)**	**C (25.3)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Table 6-2 (continued)
2015 Total Future Levels of Service

Approach	AM Peak	PM Peak
Michigan Avenue/7th Street/ CUA Driveway		
EBLTR	B (13.0)	C (25.4)
WBLTR	D (44.3)	D (44.6)
NBLTR	B (15.3)	B (16.4)
SBLTR	C (27.7)	E (78.2)
Overall	**C (33.2)**	**D (37.1)**
Michigan Avenue/John McCormack Road		
EBLT	F [108.6]	A [2.3]
Michigan Avenue/10th Street		
EBLTR	B (12.6)	F (92.1)
WBTR	D (50.9)	B (15.2)
NBLT	E (69.6)	D (37.6)
NBR	C (29.7)	C (31.5)
SBLTR	D (44.2)	D (36.2)
Overall	**D (41.3)**	**E (62.2)**
Monroe Street/7th Street		
EBLTR	E (72.6)	F (552.7)
WBLTR	F (1098.8)	F (836.5)
NBLTR	B (13.0)	B (11.1)
SBLTR	B (10.1)	A (9.6)
Overall	**F (611.5)**	**F (497.3)**
Monroe Street/8th Street		
WBL	B [10.4]	B [14.6]
NBLR	F [*]	F [434.3]
Monroe Street/9th Street/ WMATA Driveway		
EBL	A (4.4)	A (5.8)
EBTR	A (3.2)	C (25.0)
WBLTR	D (44.7)	B (10.0)
NBLTR	D (48.6)	C (32.3)
SBLTR	C (29.5)	C (30.5)
Overall	**C (32.2)**	**C (20.5)**
Franklin Street/7th Street		
EBLTR	D (40.8)	F (126.7)
WBLTR	C (25.0)	B (10.7)
NBLTR	E (56.5)	F (80.4)
SBLTR	C (31.9)	E (60.2)
Overall	**C (33.2)**	**E (74.8)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Section 7
IMPROVEMENT ANALYSIS

OVERVIEW

An incremental series of improvements were evaluated to determine the level of improvements necessary to offset the impact of the additional traffic generated as a result of the proposed redevelopment. The incremental series of improvements included adjustments to signal timings.

In addition to the incremental series of improvements, the Applicant plans to realign two of the study intersections to provide a safer operation for future traffic conditions even though these improvements are not needed to mitigate the impact of the proposed development. First, the Michigan Avenue/Monroe Street intersection was analyzed as a standard "T" intersection with more conventional signal timing phasing. Specifically, the analysis for the Michigan Avenue/Monroe Street intersection was conducted as a two-phase signal operation, with a northbound right-turn overlap phase.

Additionally, the Applicant proposes to reconfigure the intersection of 7th Street and Michigan Avenue to align with the entrance to CUA. The creation of a true four-legged intersection at Michigan Avenue and 7th Street will create a safer pedestrian and vehicular traffic pattern.

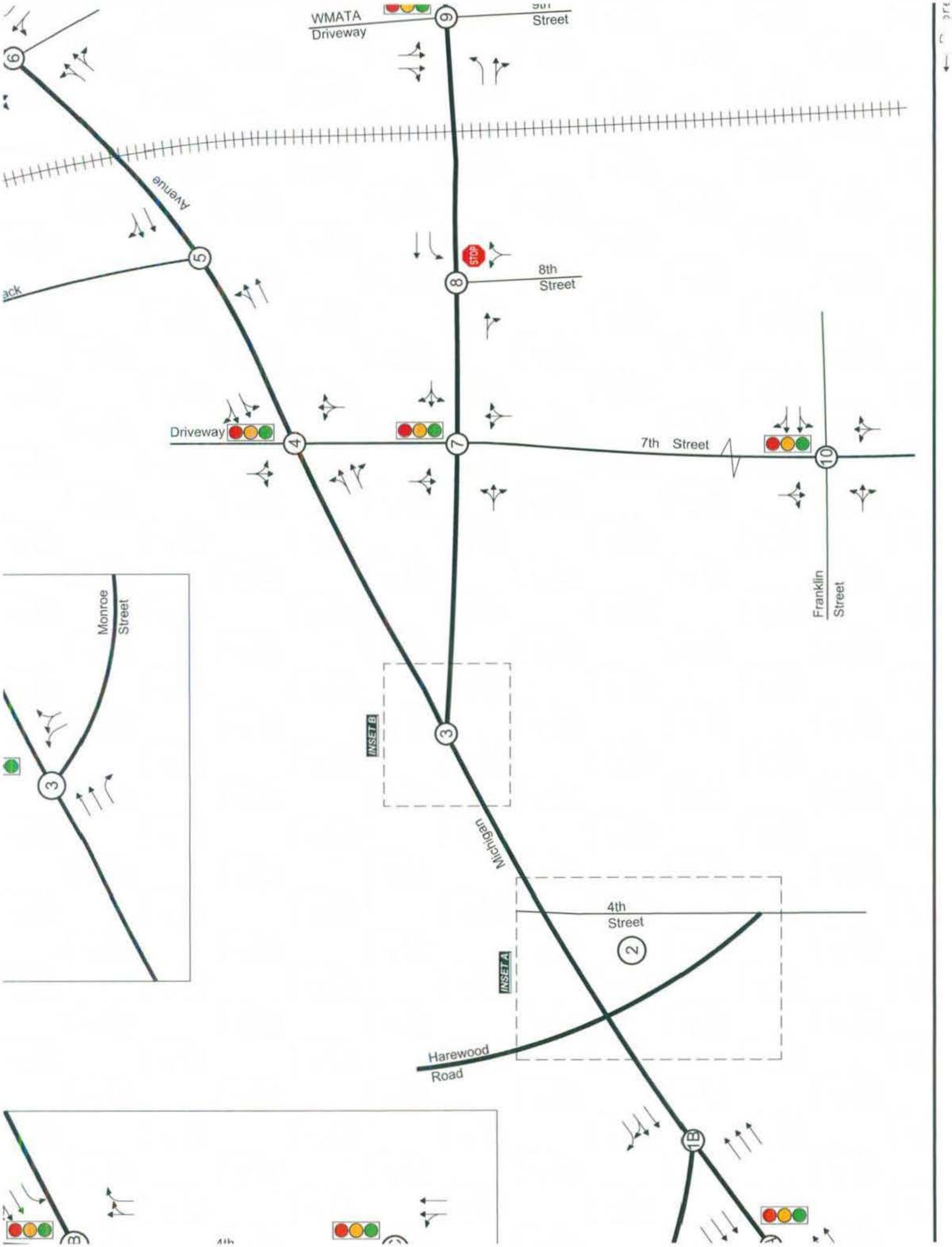
OPERATIONAL ANALYSIS WITH INCREMENTAL IMPROVEMENTS

A future conditions capacity analysis, with improvements, was performed at the study intersections utilizing the lane use and traffic controls shown on Figure 7-1, the 2015 projected total future traffic volumes shown on Figure 6-1 and existing DDOT traffic signal timings provided in Appendix C (except for the proposed and realigned signalized intersections).

The following improvements would be required to offset the impact of the proposed redevelopment:

- Timing improvements at the Michigan Avenue/Harewood Road, Michigan Avenue/4th Street, Michigan Avenue/10th Street, Monroe Street/7th Street, and Franklin Street/7th Street intersections.

Table 7-1 summarizes the results of the analysis. Level of service reports for total future conditions with improvements are provided in Appendix K.


WMATA
Driveway
Street
Avenue
ack
STOP
8th
Street
Driveway
7th Street
Franklin
Street
Monroe
Street
INSET B
Michigan
4th
Street
INSET A
Harewood
Road
1
2
3
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10
1B

Table 7-1
2015 Total Future Levels of Service with Improvements

Approach	AM Peak	PM Peak
Michigan Avenue/Irving Street SB		
EBT	B (14.4)	C (21.6)
WBT	C (22.0)	B (16.4)
SBLR	C (21.4)	C (24.1)
Overall	**B (19.9)**	**C (21.5)**
Michigan Avenue/Harewood Road		
EBLTR	F (102.2)	F (567.0)
WBTR	F (242.2)	B (11.7)
NBL	F (552.4)	F (155.4)
NBTR	D (35.7)	D (36.9)
SBLTR	D (47.3)	D (46.5)
SBR	C (33.3)	C (33.6)
Overall	**F (187.2)**	**F (316.2)**
Michigan Avenue/4th Street		
EBLTR	A (7.5)	F (231.4)
WBL	D (45.7)	F (91.8)
WBTR	F (211.7)	C (20.4)
NBTR	C (33.5)	D (44.9)
NBR	B (13.1)	C (27.8)
SBLTR	D (35.4)	D (50.3)
Overall	**F (132.2)**	**F (136.1)**
Harewood Road/4th Street		
EBR	A (0.6)	B (17.4)
NBLT	A (1.1)	A (1.3)
SBT	A (3.7)	A (5.2)
Overall	**A (1.7)**	**A (6.6)**
Michigan Avenue/Monroe Street Re-aligned		
WBLR	B (17.5)	C (34.4)
NBT	B (14.8)	C (31.6)
NBR	A (0.8)	A (1.0)
SBT	C (24.2)	A (4.9)
Overall	**B (17.6)**	**B (18.6)**
Michigan Avenue/7th Street/ CUA Driveway		
EBLTR	A (5.0)	C (27.2)
WBLTR	D (44.3)	D (41.2)
NBLTR	D (43.7)	B (15.2)
SBLTR	C (27.7)	E (78.2)
Overall	**C (33.2)**	**D (37.0)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

Table 7-1 (continued)
2015 Total Future Levels of Service with Improvements

Approach	AM Peak	PM Peak
Michigan Avenue/John McCormack Road		
EBLT	F [108.6]	A [2.3]
Michigan Avenue/10th Street		
EBLTR	B (19.1)	E (64.6)
WBTR	D (50.9)	B (13.3)
NBLT	E (69.6)	D (50.2)
NBR	C (29.7)	D (35.7)
SBLTR	D (44.2)	D (43.6)
Overall	**D (42.9)**	**D (48.1)**
Monroe Street/7th Street		
EBLTR	C (29.5)	D (35.9)
WBLTR	F (258.5)	C (24.2)
NBLTR	D (52.9)	D (46.8)
SBLTR	C (31.8)	D (49.4)
Overall	**C (156.5)**	**D (35.5)**
Monroe Street/8th Street		
WBL	A [9.9]	D [26.6]
NBLR	F [*]	F [*]
Monroe Street/9th Street/ WMATA Driveway		
EBL	A (7.2)	A (7.8)
EBTR	A (6.6)	B (19.5)
WBLTR	D (44.7)	B (10.0)
NBLTR	D (48.6)	C (32.3)
SBLTR	C (29.5)	C (30.5)
Overall	**C (33.2)**	**B (17.3)**
Franklin Street/7th Street		
EBLTR	D (47.7)	F (107.4)
WBLTR	C (27.1)	B (12.1)
NBLTR	D (51.4)	E (61.7)
SBLTR	D (47.2)	D (45.6)
Overall	**D (37.1)**	**E (62.8)**

[x.x] = unsignalized intersection control delay in sec/veh
(x.x) = signalized intersection control delay in sec/veh

TOTAL FUTURE WITH IMPROVEMENTS QUEUE ANALYSIS

A queuing analysis was conducted to determine the impact that the proposed redevelopment would have on queue lengths in the study area with the recommended improvements. Synchro was used to conduct the analyses, using the 95th percentile queue lengths. The results are summarized in Table 7-2. Queue reports are provided in Appendix L.

Table 7-2
2015 Total Future Queue Analysis with Improvements

INTERSECTION	AVAILABLE STORAGE[3]	2015 TOTAL FUTURE WITH IMPROVEMENTS	
		AM	PM
Michigan Avenue/Irving Street SB			
EBT	1540	101	284
WBT	500	138	151
SBLR	>1000	155	354
Michigan Avenue/Harewood Road			
EBLTR	475	414	1225
WBTR	50	900	441
NBL	100	429	303
NBTR	100	233	282
SBLTR	>1000	293	206
SBR	100	193	174
Michigan Avenue/4th Street			
EBLTR	500	24	21
WBL	800	418	284
WBTR	800	1342	392
NBTR	>1500	61	155
NBR	>1500	72	172
SBLTR	50	60	148
Harewood Road/4th Street			
EBR	100	0	0
NBLT	1400	0	0
SBT	115	18	21
Michigan Avenue/Monroe Street Re-aligned			
WBL	355	148	206
NBT	700	261	429
NBR	700	0	0
SBT	330	216	46

[1] Reported queues are 95th percentile queues from Synchro.
[2] All queues are in feet.
[3] Length of turn lane or distance to nearest major intersection.

Table 7-2 (continued)
2015 Total Future Queue Analysis with Improvements

INTERSECTION	AVAILABLE STORAGE[3]	2015 TOTAL FUTURE WITH IMPROVEMENTS	
		AM	PM
Michigan Avenue/7th Street/CUA Driveway			
EBLTR	340	71	446
WBLTR	1140	694	455
NBLTR	190	73	55
SBLTR	260	79	234
Michigan Avenue/John McCormack Road			
EBLT	220	140	7
Michigan Avenue/10th Street			
EBLTR	1125	322	880
WBTR	270	783	193
NBLT	225	253	202
NBR	165	37	114
SBLTR	235	237	237
Monroe Street/7th Street			
EBLTR	375	458	995
WBLTR	630	1179	538
NBLTR	285	322	226
SBLTR	190	100	174
Monroe Street/8th Street			
WBL	100	16	23
WBT	305	*	*
Monroe Street/9th Street/WMATA Driveway			
EBL	100	9	7
EBTR	305	115	466
WBLTR	225	1067	225
NBLTR	285	167	55
SBLTR	N/A	16	12
Franklin Street/7th Street			
EBLTR	590	492	839
WBLTR	1000	347	130
NBLTR	95	184	351
SBLTR	280	137	144

[1] Reported queues are 95th percentile queues from Synchro.
[2] All queues are in feet.
[3] Length of turn lane or distance to nearest major intersection.

Section 8
TRANSPORTATION DEMAND MANAGEMENT

In an effort to decrease reliance on the personal automobile and encourage the use of transit, ridesharing, bicycling, and walking, a Transportation Demand Management (TDM) Program should be implemented. "TDM is a general term for strategies that result in more efficient use of transportation resources. There are many different TDM strategies with a variety of impacts. Some improve the transportation options available to consumers, while others provide an incentive to choose more efficient travel patterns. Some reduce the need for physical travel through mobility substitutes or more efficient land use. TDM strategies can change travel timing, route, destination, or mode."[25]

The following strategies should be considered:

A. Designate a Transportation Management Coordinator (TMC) to implement the TDM program and advise residents and tenants of the availability and location of the TDM coordinator and program at least once a year. The position may be part of other duties assigned to the individual. Space should be designated to house the TMC where information on the various aspects of the TDM program and information regarding available public transportation would be available. Duties of the Transportation Management Coordinator would include the following:

   1. Assist residents and tenants in making effective and efficient commuting choices.
   2. Disseminate Metrorail, Metrobus, ridesharing, and other relevant transit options to new residents and tenants.
   3. Solicit support from the Metropolitan Washington Council of Governments (MWCOG) Commuter Connections program, the Washington Metropolitan Area Transit Authority (WMATA), and others.
   4. Provide on-site assistance to residents and tenants in forming and maintaining carpools.
   5. Register carpool participants, transit users, bicyclists, and walkers in the Guaranteed Ride Home (GRH) program.
   6. Encourage residents and tenants to ride bikes or walk to work.
   7. Market and promote the TDM Program among residents and tenants through printed materials and web sites (if available).
   8. Provide links to CommuterConnections.com and goDCgo.com on developer and/or property management websites.

B. Incentives to use transit, including:

   1. Provide information on Metrorail, Metrobus, and other public transportation facilities, services, routes, schedules, and fares.
   2. Disseminate information to transit users regarding free guaranteed rides home in cases of emergency.
   3. At the time of initial lease/sales, provide SmarTrip cards to residents.
   4. At the time of initial lease/sales, provide a one-time application fee subsidy in a car sharing program for each residential unit.
   5. Provide safe, convenient, and attractive pedestrian connections on-site.

C. Parking management, including:

   1. Provide parking spaces on site for a car sharing service (e.g. Zip or Flex Car).

D. Bicycle and pedestrian programs, including:

   1. Encourage residents and tenants to ride bikes or walk to work.
   2. Provide convenient, attractive, and secure bike parking facilities.
   3. Establish Smart Bike Station.

E. Telecommuting and teleworking programs, including:

   1. Pre-wire all residential units with broadband, high capacity data/network connections in multiple rooms, in addition to standard phone lines.

   2. Provide and maintain at least one on-site business center (including at a minimum access to a copier and fax and internet services), which shall be made available and open to all residents who choose to work from home.

F. Notify residents and tenants of on-site restaurants, retail stores, and service facilities (such as dry cleaners, bank, hair salons) available on-site, thereby reducing mid-day and peak hour auto travel.

G. Design secure, off-street loading bays and docks for retail, arts and residential buildings.

Section 9
CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this study are as follows:

1. The CUA South Campus site is proposed to be rezoned from the R-4, R-5-A, and C-M-1 Zone Districts to the C-2-B and R-5-B Zone Districts to accommodate the construction of 875,962 square feet of rental residential, condominium residential, and townhouses; 83,073 square feet of retail space; and 17,907 square feet of arts space.

2. Access to the site would be provided along 7th Street, 8th Street, Monroe Street, Lawrence Street and Kearney Street via multiple driveways to the various areas of the redevelopment.

3. With the existing bicycle and pedestrian systems, the SmartBike and Zipcar systems, and the Metrorail, Metrobus and various shuttle bus systems available in the site vicinity, alternate forms of transportation currently are prevalent in the study area.

4. The proposed redevelopment of the CUA South Campus site would be in conformance with the Brookland-CUA Metro Station Small Area Plan. Additionally, the Applicant plans to construct several of the desired improvements outlined in the Plan, including the realignment of the Michigan Avenue/Monroe Street and Michigan Avenue/7th Street intersections.

5. With the proposed Arts Walk and provision for the accommodation of the future extension of the Metropolitan Branch Trail in Block C of the CUA South Campus site, the proposed development would provide for excellent pedestrian and bicycle connectivity between the section of the Metropolitan Branch Trail on 8th Street with the section north of the Brookland-CUA Metro Station access under the Michigan Avenue bridge. Additionally, the proposed redevelopment would be in conformance with the goals of the draft DDOT Metropolitan Branch Trail Concept Plan.

6. Currently, all study intersections operate at acceptable levels of service (i.e. LOS D or better), with the exception of the following intersections:

   - Michigan Avenue/Harewood Road
   - Michigan Avenue/4th Street
   - Michigan Avenue/Monroe Street (A)
   - Monroe Street/7th Street
   - Monroe Street/8th Street

7. Under background conditions (with pipeline developments), the following intersections have lane groups that would operate deficiently under background conditions:

   - Michigan Avenue/Harewood Road
   - Michigan Avenue/4th Street
   - Michigan Avenue/Monroe Street (A)
   - Michigan Avenue/7th Street/CUA Driveway
   - Michigan Avenue/John McCormack Road
   - Michigan Avenue/10th Street
   - Monroe Street/7th Street
   - Monroe Street/8th Street
   - Franklin Street/7th Street

8. Taking into account internal trips stemming from the synergistic relationship of the uses, the non-auto mode share, and pass-by trips to/from the retail uses, the proposed development would generate an estimated 398 new AM peak hour external vehicle trips and 371 new PM peak hour external vehicle trips.

9. At the majority of the study intersections, the number of trips generated by the proposed redevelopment is expected to account for 1.6 percent to 5.5 percent of the total future traffic forecasts. At the Monroe Street/7th Street intersection, the traffic associated with the redevelopment is expected to account for 15.8 percent to 17 percent of the total future traffic forecasts.

10. According to the parking requirements outlined in the DCMR, 475 on-site parking spaces would be required for the proposed mixed-use development. The proposed development plan would provide 904 parking spaces.

11. As part of the proposed redevelopment, the Applicant is proposing to reconfigure the Michigan Avenue/Monroe Street intersection to create a right-angle intersection that remove the current high speed right turn onto Monroe Street and would reduce the overall speed of traffic along Monroe Street. This reconfiguration also would allow for a significantly safer pedestrian experience in crossing Michigan Avenue.

12. The Applicant also proposes to reconfigure the intersection of 7th Street and Michigan Avenue to align with the entrance to CUA. The creation of a true four-legged intersection at Michigan Avenue and 7th Street will create a safer pedestrian and vehicular traffic pattern.

13. The increase in traffic at the study intersections is expected to have some impact on traffic operations and could be offset by the following additional improvements:

    - Timing improvements at the Michigan Avenue/Harewood Road, Michigan Avenue/4th Street, Michigan Avenue/10th Street, Monroe Street/7th Street, and Franklin Street/7th Street intersections.

14. The Applicant should implement an aggressive TDM program that would encourage residents and tenants to utilize non-SOV (single occupancy vehicle) modes of transportation to and from the site. The TDM program should include the following:

    - Designation of a Transportation Management Coordinator,
    - Provision for SmarTrip cards for new residents at the time of initial sales/lease,
    - Allotment of a number of parking spaces for car sharing service in the public garage, and
    - Establishment of a Smart Bike Station on site.

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