Traffic Impact Study

8th and H Street NE

Planned Unit Development Washington, D.C.



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EXECUTIVE SUMMARY

The following report presents the findings of a traffic impact analysis conducted in support of the 8th and H Streets NE Planned Unit Development (PUD) in Washington, D.C. The project involves the redevelopment of an existing community shopping center located on the south side of H Street between 8th and 10th Streets, NE. The redevelopment would consist of a residential apartment complex with ground floor retail.

The capacity analyses undertaken in this study provided the following results:

Existing Conditions

Under existing conditions, all study area intersections operate at acceptable Levels of Service.

Future Background Conditions

Under these conditions which include regional growth and traffic from future background developments, all study area intersections would continue to operate at acceptable Levels of Service, with negligible increases in delay.

Total Future Conditions

Capacity analyses for the projected total future conditions, including the net traffic generated by the proposed development, indicate that the study intersections would continue to operate at acceptable levels of service. These results confirm that the proposed development would have minimal impacts on the study area roadway network.

The development site is currently served by several Metrobus routes which run along H and 8th Streets, with connections provided to several Metrorail stations including Union Station. Street car routes are also planned for the H Street and 8th Street corridors in the vicinity of the site. These transit services would serve to reduce peak period and daily vehicular site trips and related impacts, in accordance with the City's policies and efforts to reduce traffic congestion and pollution.

In accordance with DDOT requirements, the Applicant proposes the implementation of a Transportation Management Plan (TMP) to reduce single-occupant auto peak hour and daily trips by employees and patrons. The TMP would include measures to encourage use of alternative travel modes including transit, rideshare, bicycle and walking. This Plan is included in Appendix E of this report.

The subject PUD would be provided with underground parking and at-grade loading berths for the proposed residential and retail uses. These facilities would be quite adequate, compared with the City zoning requirements.



Based on the above, the proposed development can be approved as planned without having any significant traffic impacts on the surrounding road network. In addition, the proposed development would not be objectionable to adjacent properties and neighborhoods from the perspectives of traffic and parking.



INTRODUCTION

This report presents the findings of a traffic impact study prepared in support of a Planned Unit Development (PUD) application for the 8^{th} Street and H Street mixed use development.

The subject site, located on Lot 55 -Square 912 in Ward 6, is bounded by H Street NE to the north, 8th Street NE to the west, a public alley and residential developments to the south (Lots 57 and 59), and 10^{th} Street NE to the east, as shown in Figure 1. The site is presently zoned C-2-B and is occupied by a small shopping center. The applicant, The Rappaport Companies, is proposing to redevelop the approximately two (2) acres of site with a mix of residential and retail uses.

PROJECT SCOPE

This traffic study was conducted in general accordance with parameters outlined in a traffic study scoping document (Appendix A). A copy of the scoping document is included in the Appendix A of this report.

The primary purpose of this study is to evaluate the transportation impacts of the proposed development on the study area roadway network and recommend potential improvements needed to mitigate any identified adverse impacts. As proposed in the submitted scoping document, the study area roadway network is defined by the following intersections:

- 1) 8th Street & H Street, NE
- 2) 9th Street & H Street, NE
- 3) 10th Street & H Street, NE
- 4) 10th Street & G Street, NE
- 5) 8th Street & G Street, NE
- 6) 10th Street & Service Alley
- 7) 8th Street & Service Alley

The above listed numbers are used in Figure 2 (at page 3) to indicate the locations of these intersections.

Capacity analyses were performed to determine the Level of Service (LOS) for the AM and PM peak hours at the study intersections, with respect to existing conditions, future background conditions (future no-build) and total future conditions with the development built and occupied. The *Highway Capacity Manual 2000* (HCM) methodology through *Synchro version 6.0* was used for all analyses. Detailed LOS descriptions are provided in the Appendix B.



Figure 1 – Site Location

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Figure 2 – Study Intersections

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For purposes of this study, the proposed development was assumed completely built and occupied in one phase by 2012. As per the DDOT traffic analysis requirement, the analysis year is required to be the year following the build-out year, i.e., 2013.

Land use developments included in the future background analysis were limited to those approved but not fully built and occupied. These developments include:

- 3rd & H Place
- 318 Eye Street
- Station Place
- Senate Square
- Full Square
- Capitol Place
- H Street Plaza
- 830 Eye Street

The following summarizes the tasks undertaken in this study:

- Field reconnaissance of existing roadway and intersection geometrics, traffic controls, speed limits and operations.
- Discussions/meetings with the District Department of Transportation (DDOT) staff regarding the study scope.
- Peak hour intersection turning movements counts.
- Determination of existing intersection levels of service.
- Forecast of background future traffic conditions for 2013 based on existing counts, annual growth in through traffic and traffic generated by other approved/future developments.
- Calculation of background intersection levels of service based on background traffic forecasts and existing traffic controls.
- Estimation of AM peak hour, PM peak hour, and daily trips that would be generated by the new development based on the rates and equations published by the Institute of Transportation Engineers (ITE), Trip Generation Manual, 7th edition. Mode split assumptions were made based on observations of similar developments in the District and the "2005 Development Related Ridership Survey Final Report", (March 2006), prepared by the Washington Metropolitan Area Transit Authority, WMATA.
- Forecast of total future traffic volumes for 2013 (project build-out year plus one year) based on background future traffic forecasts and site traffic assignments.

• Computation of total future intersection levels of service based on total future traffic forecasts, existing and future traffic controls, and existing and future intersection geometrics.

Sources of data for the above analyses include traffic counts conducted by Gorove/Slade Associates, Inc.; the ITE *Trip Generation Manual* (7th Edition); site plans prepared by Torti Gallas and Partners; the District Department of Transportation (DDOT); the "2005 *Development Related Ridership Survey*" prepared by WMATA; and the files/library of Gorove/Slade Associates, Inc.

EXISTING CONDITIONS

Site Access and Existing Roadway Network

The proposed development site is provided with regional access via several roadways including Benning Road, Bladensburg Road, North Capitol Street, Florida Avenue, DC 295/I-295 and I-395. Immediate/local access is provided primarily by H, 8th, 9th and 10th Streets.

The following is a description of the key roadways serving the immediate access needs of the site:

• H Street, NE

The District Department of Transportation (DDOT) classifies this roadway as a principal arterial in the vicinity of the site. This facility serves average annual weekday traffic (AAWT) volume of approximately 19,500 vehicle trips in the vicinity of the study area. The roadway is oriented east-west and has four travel lanes in the study area (two in each direction). Parking is time restricted on both sides of the street. The posted speed limit is 25 mph.

• δ^{th} Street NE

DDOT classifies this roadway as a collector facility in the vicinity of the site. It carries average annual weekday traffic (AAWT) volume of approximately 7,900 vehicle trips in the vicinity of the study area. The roadway is oriented north-south and has two travel lanes (one in each direction), with time restricted parking on both sides of the street. The posted speed limit is 25 mph.

■ G Street NE

DDOT classifies this roadway as a local street in the vicinity of the site. The average annual weekday traffic (AAWT) volume served is approximately 3,000 vehicles. The roadway is oneway westbound and has one travel lane, with Residential Permit Parking on the street. The posted speed limit is 25 mph.

■ 10th Street NE

DDOT classifies this facility as a local street in the vicinity of the site. Based on turning movement counts conducted as part of this study, the average annual weekday traffic (AAWT) volume is approximately 2,400 vehicles. The roadway is oriented north-south and has two travel lanes (one in each direction) to the south of H Street. Tenth Street is one-way southbound just north of H Street. Parking is time restricted on both sides of the street. The speed limit is 25 mph.



9th Street NE

This facility is classified as a local street in the vicinity of the site. Based on turning movement counts as part of this study, the average annual weekday traffic (AAWT) volume is approximately 1,450 vehicles. The roadway is oriented north-south and has two travel lanes (one in each direction) with Residential Permit Parking on the street. The speed limit is 25 mph.

Gorove/Slade conducted field reconnaissance to obtain the existing lane usage and traffic controls at the intersections within the study area. These are illustrated in Figure 5 on page 10.

Existing Transit

The Site is located at the center of two high-frequency Metrobus corridors (H Street, NE and 8th Street, NE) served by a total of five (5) Metrobus routes (see Figure 3). There are also seven (7) additional routes with stops within a five-minute walk or less of the site.

The X1 and X2 Metrobus routes serve the Site along H Street and connect the Site to Union Station and Downtown, DC to the west and the Minnesota Avenue Metro Station to the east via H Street. The 90, 92, and 93 Metrobus routes along 8th Street, NE connect the site to Gallaudet University, the New York Avenue Metro Station and the U Street corridor to the north and west; and Eastern Market, the Southeast Waterfront, and the Anacostia Metro Station to the south.

Metrobus headways along the H Street and 8th Street corridors tend to be every 5-10 minutes during the weekday morning and evening peak periods and every 10-15 minutes during most other times of the week and weekend. The X1 and X2 Metrobus routes are operated with extra-capacity articulated buses along H Street.

The D1, D3, D4, D8, X2, X6, and X8 Metrobus routes all have stops within a 5-minute walk of the Site and provide service to key destinations such as Union Station, Downtown DC, New York Avenue, the National Arboretum and Northeast DC.



Figure 3 – Existing Metrobus Routes

Planned Future Transit

Within the next five (5) years, DDOT and WMATA are planning to introduce streetcar lines along both H and 8th Streets adjacent to the Site. The Site would serve as the nexus of these two lines (see Figure 4). The H Street Streetcar line would connect Union Station to the west with the Benning Road Metro Station to the east. At Union Station, there would be a connection to a planned busway along Massachusetts Avenue and K Street, providing linkages to Downtown, DC and Georgetown. The 8th Street streetcar line would run from H Street to the north to M Street, SE to the south, with connections to additional streetcar lines serving the Anacostia waterfront and corridors east of the Anacostia River.



Figure 4 – Planned Future DC Transit Routes



Figure 5 – Existing and Future Lane Use and Traffic Controls

Existing Traffic Volumes

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Turning movement counts were collected at the key study intersections between the hours of 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m. on Wednesday, June 6, 2007. The results of the traffic counts are included in Appendix C and summarized on Figure 6. Higher traffic volumes were experienced for westbound travel along H Street in the AM peak hours and westbound during the PM peak hours. This reflects commuting traffic trends along H Street as commuters travel toward the Washington, DC business district in the morning, and return in the afternoon. The AM peak hour for the system of intersections being studied occurs between 8:00 a.m. and 9:00 a.m.; the PM system peak hour occurs between 4:00 p.m. and 5:00 p.m.

Existing Capacity Analysis

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

The existing LOS capacity analyses were based on: (1) the existing lane use and traffic controls shown on Figure 5; (2) the peak hour traffic volumes for each study intersection which are shown in Figure 6; and (3) the *Highway Capacity Manual 2000* (HCM) methodologies (using Synchro 6 software). The average delay and overall LOS is presented for each study intersection. Where applicable, the LOS of each approach is also analyzed. Only all-way stop sign and traffic signal controlled intersections have an overall average delay and LOS. Two-way stop controlled (TWSC) intersections do not have an overall LOS; LOS is defined for just minor movements. Since LOS is based on the average delay experienced by a motorist, an approach without a stop-sign or unimpeded right-turn movements has no definable LOS.

Copies of the LOS calculation worksheets are included in the Appendix D. Table 1 shows the results of the capacity analyses, including LOS and average delay per vehicle (in seconds).

The capacity analyses show that all study area intersections operate acceptably during the AM and PM peak hours. The southbound movement of the 8^{th} Street/H Street intersection would operate at LOS E during the afternoon peak hour. The local streets surrounding the site operate with relatively low delays, due to low vehicular volumes. These results indicate that excess capacity exists within the street system.



Figure 6 – Existing Traffic Volumes



Table 1 – Existing Levels of Service

	Existing Conditions					
Intersection (Approach)	AM Peak Hour		PM Peak Hou	r		
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service		
8 th Street NE and H Street NE						
Overall	11.4	A	21.5	С		
Eastbound	5.6	А	12.4	В		
Westbound	3.3	A	3.9	А		
Northbound	40.0	D	36.0	D		
Southbound	45.5	D	73.1	E		
9th Street NE and H Street NE						
Overall	7.7	А	6.8	А		
Eastbound	3.9	A	4.1	А		
Westbound	7.6	A	5.2	А		
Northbound	29.0	С	30.8	С		
Southbound	29.0	С	30.4	С		
10 th Street NE and H Street NE						
Overall	12.3	В	9.1	А		
Eastbound	2.7	А	3.1	А		
Westbound	12.2	В	5.8	А		
Northbound	35.1	D	39.7	D		
Southbound	31.9	С	37.1	D		
10th Street NE and G Street NE						
Overall	9.4	А	8.2	А		
Westbound	10.1	В	8.3	А		
Northbound	8.9	А	8.3	А		
Southbound	8.5	А	8.1	А		
8 th Street NE and G Street NE						
Overall	13.9	В	10.1	В		
Westbound	15.3	С	9.8	А		
Northbound	13.8	В	10.5	В		
Southbound	11.6	В	9.9	А		
10th Street NE and Service Alley East						
Eastbound	9.0	А	9.0	А		
8th Street NE and Service Alley West						
Westbound	9.9	А	9.9	А		

FUTURE BACKGROUND CONDITIONS

Future background conditions represent future traffic levels under a no-build scenario. These conditions are a basis for comparison to the total future conditions, which include traffic from the 8^{th} and H Streets NE PUD.

For the purposes of this study, it was assumed that the proposed development would be built and occupied within 5 years or by 2012. In order to develop background traffic forecasts (or future traffic forecasts without the development, a composite of existing traffic, traffic growth and traffic generation from other future area developments was determined for 2013 – based on DDOT requirements (2012 plus one year).

Traffic Growth

Adjusting the existing volumes by a growth factor accounts for regional growth outside the study area and unforeseen redevelopment or employee population growth that is not specifically included in the background developments below. To maintain a highly conservative estimate, a 2.0% growth was applied to the through movements along the H Street NE.

Future Background Developments

A list of planned and approved developments as well as developments presently under construction was obtained from several sources including DDOT staff and past traffic studies conducted in the area. However, only approved developments were included in the analysis. The developments were also assessed with respect to location and travel patterns to determine if their trips would contribute to the future traffic within the study area. Those developments with negligible or no effects on the study area were not specifically included in the analysis. Traffic contribution as a result of these developments was accounted for in the regional traffic growth. Table 2 shows the list of background developments relative to the proposed development site.

Background Development Trip Generation

The anticipated vehicle trips to be generated by the background developments were estimated based on data provided in the ITE's Trip Generation, 7th Edition, WMATA's Development-Related Ridership Survey, 2005 for any applicable transit reduction, and past studies conducted in the area from the library of Gorove/Slade Associates, Inc.



Development	Details/Description	Completed by 2012 ⁽¹⁾
(1) 3 rd & H Street	This site is located at 3 rd and H Street. It would include approximately 230 residential units and 52,000 square feet of retail.	Yes (2009)
(2) 318 Eye Street	This site is located at 318 I Street NE. It would include approximately 240 residential units.	Yes
(3) Station Place	This site is located at 700 2nd Street NE. It would include approximately 746,000 square feet of office.	Yes (2009)
(4) Senate Square	This site is located at 800 3 rd Street NE. It would include approximately 430 residential units.	Yes (2007)
(5) Full Square	The site is located between H and I Streets and 3 rd and 4 th Streets. This mixed-use development would include 2.6K square feet of retail, 53.3K square feet grocery store, and 232 residential units.	Not Available
(6) Capitol Place	The site is located between Second and Third and G and H Streets. This mixed-use development would include 20K square feet of retail and 302 residential units.	Not Available
(7) H Street Plaza	This site is located at 601.645 H Street NE and is being developed by Washington Real Estate. It would include approximately 240 residential units and 13,476 square feet of retail.	Yes (2009)
(8) 830 Eye Street	The site is located North of 8 th Street and west of 9 th Street, NE. It would include 213,895 square feet of office.	Not Available

Table 2 – List of Background Development





Figure 7 – Background Development Location

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<u>Synergy Reductions</u>. According to ITE, some trips between various land uses in multi-use developments are made internally by walking or driving on interior roadways and do not affect the major street system. This relates to one or more background developments where there is more than one use. For example, residents of the 3rd & H Place may also be patrons of the retail uses of the same development. Synergy reductions were calculated for the afternoon peak hours using the internal capture rates published in the *ITE Trip Generation Handbook*. Table 3 shows the reductions.

<u>Transit Reductions.</u> The WMATA *Development-Related Ridership Survey 2005* provides a good look at the travel patterns within the Washington DC Metro region. The survey confirmed previous findings that the walking distance between a site and transit locations, primarily Metro-rail and buses, influences the mode of commute. The background developments included in the analysis were in close proximity of each other and, based on distance, would be mostly served by Union Station Metro Station when compared to other nearby Metro stations.

Table 3 shows the projected trip generation for the background developments considered.

Future Transportation Improvements

H Street NE Corridor Transportation Study

H Street NE forms part of the Washington DC Great Streets Initiative. As part of the Initiative, the H Street NE Corridor Transportation Study was commissioned. The study was to determine improvements to H Street; and focused on ways to improve transit, pedestrian facilities, parking, and reduce vehicular impacts on the corridor.

The Study recommended improvements to the streetscape along H Street, including the sidewalks, lighting, trees and other elements. The recommended cross-section of H Street between 3^{rd} and 14^{th} Streets would not be significantly different from the existing configuration and these improvements would not affect the future capacity analysis or traffic trends. The future cross-section of H Street includes the following elements:

- Two eight (8) foot parking lanes;
- Two twelve (12) foot shared transit/travel lanes;
- Two ten (10) foot travel lanes
- Fifteen (15) foot sidewalks
- Eight (8) foot bump outs at key intersections (including 8th Street/H Street intersection)

Table 3 – Background Development Trip Generation

	Land Use	Land	Si	ze	Δ	M Peak Ho	Irip Ge	eneration	M Peak H	our
		Use Code	-		In	Out	Total	In .	Out	Total
1	3rd and H Place NE			0						
	Residential	220	230	Units	23	93	116	94	50	144
	synergy with retail							(28)	(19)	(47)
	Residential (with synergy)				23	93	116	66	31	97
	transit reduction		65%		(15)	(60)	(75)	(43)	(20)	(63)
	Residential Subtotal				8	33	41	23	11	34
	Retail	820	61	kSF	71	45	116	216	233	449
	synergy with residential Retail (with synergy)				71	45	116	(19)	(28)	(47)
	transit reduction		51%		(36)	(23)	(59)	(100)	(105)	(205)
	Retail Subtotal		70		35	22	57	97	100	197
	3rd and H Place NE Total				43	55	98	120	111	230
2	318 Eye Street			Dwelling						
	Residential	220	140	l Inits	14	58	72	62	33	95
	transit reduction		63%		(9)	(37)	(45)	(39)	(21)	(60)
	318 Eye Street Total				5	21	27	23	12	35
3	Station Place									
	General Office Building	710	741	kSF	819	112	931	155	754	909
	transit reduction		70%		(573)	(78)	(652)	(109)	(528)	(636)
	Station Place Total				246	34	279	46	226	273
4	Sanata Squara				2.10		2/0	-10		270
•	Senate Square	000	175	Dwelling	47	100	0.00	101		070
	Residential	220	4/5	Units	47	189	236	181	98	2/9
	transit reduction		68%		(32)	(129)	(160)	(123)	(67)	(190)
	Senate Square Total				15	60	76	58	31	89
5	Full Square									
	Retail		18	kSF	34	22	56	97	105	202
	synergy with residential							(9)	(13)	(22)
	Retail (with synergy)				34	22	56	88	92	180
	transit reduction		5007		(17)	(11)	(28)	(44)	(46)	(90)
	Datail Cubtate		50%				(20)	(444)	(40)	(50)
	retall Subtotal			Dwelling	17		28	44	46	90
	Residential		700	Units	69	278	347	262	141	403
	synergy with retail							(13)	(9)	(22)
	Residential (with synergy)				69	278	347	249	132	381
	transit reduction		64%		(44)	(178)	(222)	(159)	(84)	(244)
	Residential Subtotal				25	100	125	90	48	137
	Full Square Total		1		42	111	153	134	94	227
A	Capitol Place						100		2.4	
3	Posidontial		200	Dwelling	20	100	150	100	64	104
	Residential		302	Units	30	122	152	120	64	184
	synergy Reduction							(12)	(7)	(19)
	Residential (with synergy)				30	122	152	108	57	165
	transit reduction		72%		(22)	(88)	(109)	(78)	(41)	(119)
	Residential Subtotal				8	34	43	30	16	46
	Office		13	kSF	33	4	37	16	77	93
	Synergy Reduction							(3)	(3)	(6)
	Office (with Synergy)				22	л	27	12	7/	87
	Transit Poduction		CENT		(01)	4	(04)	13	/4	0/ /ER
			62%		(21)	(3)	(24)	(8)	(48)	(5/)
	Uttice Subtotal				12	1	13	5	26	30
	Retail		13	kSF	28	18	46	78	85	163
	synergy Reduction							(9)	(13)	(22)
	Retail (with synergy)				28	18	46	69	72	141
	transit reduction		61%		(17)	(11)	(28)	(42)	(44)	(86)
	Retail Subtotal		,,,,		11	7	18	27	28	55
	Capital Place Total				31	42	74	62	70	131
7	U Street Plaza					72	,4		,5	101
'	n Sueel Plaza			105						
	Uttice		90	kSF	151	21	172	31	149	180
	Synergy Reduction							(2)	(3)	(5)
	Office (with Synergy)				151	21	172	29	146	175
	Transit Reduction		48%		(72)	(10)	(83)	(14)	(70)	(84)
	Office Subtotal				79	11	89	15	76	91
	Residential		234	Dwelling	24	94	118	95	51	146
	Synergy Reduction			UNITS				(10)	(5)	(15)
	Residential (with Supermi)				24	94	119	25	16	121
	Trendit Deductio		E F art		/1 3	54 /E ^>	110	(47)	40	131
	Paridential Subtatal		55%		(13)	(52)	(00)	(4/)	(23)	(/2)
	Retail		٥	kSF	23	42	33	38 61	67	128
	Synergy Reduction		5					(7)	(10)	(17)
	Retail (with Synergy)				23	14	37	54	57	111
	Transit Reduction		38%		(9)	(5)	(14)	(21)	(22)	(42)
	Retail Subtotal				14	9	23	33	35	69
8	830 Eye Street				104	62	102	80	132	213
	Office	710	214	kSF	103	14	117	18	89	108
_	TOTALBACKGROUND DEVELOP	MENT TRI	IPS		589	399	989	547	765	1,312

Source: Trip Generation Manual, 7th Editio, Institute of Transportation Engineers, 2003 and background development traffic study reports. Note: Data for AM Peak Hour and PM Peak Hour show data for Peak Hour of Adjacent Street Traffic.

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Future Background Traffic Forecasts

Background traffic forecasts were developed based on a composite of existing traffic counts and anticipated growth in traffic as a result of any future background developments – locally and regionally. The 2% ambient traffic growth along H Street was added to the existing traffic to account for those developments that may contribute to traffic and were not included as specific background (or pipeline) developments. Traffic growth was only added to H Street since it is the only road within the study area expected to serve regional traffic. The traffic generated by specific background/pipeline development was then added to the existing traffic with ambient growth. Figure 8 shows the resulting background traffic volumes (future no-build) for the study area intersections.

Future Background Analysis

Background peak hour levels of service (without the 8th and H Streets NE PUD) were calculated based on: (1) existing lane use and traffic controls shown on Figure 5; (2) the background traffic volumes shown on Figure 6; and (3) the Highway Capacity Manual 2000 (HCM) methodologies (using Synchro 6 software). Copies of LOS calculation worksheets are included in the Appendix D. Table 4 displays the results of the future background capacity analyses, including LOS and average delay per vehicle (in seconds).

The background capacity analyses show that all study area intersections would continue to operate acceptably – similar to existing conditions. Marginal increases in delay would occur for the through movements of the signalized intersections along H Street NE. However, these changes would not be obvious to motorists. The stop-controlled intersections would not experience any change in level of service or delay.



Figure 8 – Future Background Traffic Volumes

	Background Conditions					
Intersection (Approach)	AM Pe	ak Hour	PM Pe	eak Hour		
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service		
8 th Street NE and H Street NE						
Overall	10.9	В	21.3	С		
Eastbound	5.8	А	13.9	В		
Westbound	3.7	А	3.7	А		
Northbound	40.0	D	36.0	D		
Southbound	45.5	D	73.1	E		
9th Street NE and H Street NE						
Overall	10.8	В	6.8	Α		
Eastbound	3.8	А	4.7	А		
Westbound	11.8	В	5.0	А		
Northbound	29.0	С	30.8	С		
Southbound	29.0	С	30.4	С		
10 th Street NE and H Street NE						
Overall	14.5	В	8.6	Α		
Eastbound	2.7	А	3.2	А		
Westbound	15.7	В	6.3	А		
Northbound	34.9	С	39.7	D		
Southbound	31.8	С	37.1	D		
10th Street NE and G Street NE						
Overall	9.4	Α	8.2	Α		
Westbound	10.1	А	8.3	А		
Northbound	8.9	А	8.3	А		
Southbound	8.5	А	8.1	А		
8 th Street NE and G Street NE						
Overall	13.9	В	10.1	В		
Westbound	15.3	С	9.8	А		
Northbound	13.8	В	10.5	В		
Southbound	11.6	В	9.9	А		
10 th Street NE and Service Alley East						
Eastbound	9.0	А	9.0	А		
8th Street NE and Service Alley West						
Westbound	9.9	A	9.9	A		

Table 4 – Future Background Levels of Service

TOTAL FUTURE TRAFFIC CONDITIONS

Total future traffic conditions represent future traffic in the study area including existing traffic, background growth, and traffic generated by the 8th and H Streets NE PUD.

8th and H Streets NE PUD Transportation Features

Figure 9 shows the ground floor site plan of the proposed 8th and H Streets NE PUD. As shown, the H Street vehicular access would be removed with the future layout. This design is in keeping with the findings of the H Street NE Corridor Study, which states that "45% of the population in the Retail Trade Area (RTA) live within walking distance of the H Street Corridor (¼ mile) and provides a strong base for pedestrian, bike and transit services." The study projects that pedestrian activity would double by 2025; as such, the removal of the H Street site vehicular access, which forms the northbound approach of the 9th Street/H Street intersection, would provide a more pedestrian safe and bike friendly environment for the portion of H Street that fronts the site. In this context, the site plan also indicates that the sidewalks along the site frontage would be approximately 16- to 28-ft wide along H Street, 30-ft along 8th Street and 27-ft along 10th Street.

Vehicular access to the proposed development would be provided via ramps from 8th and 10th Streets that lead to underground parking for both retail patrons and residents of the PUD. Outbound retail trips would be restricted to the 8th Street access point.

Parking

Table 5 shows the off-street parking required by the City's Municipal Regulations and the proposed parking supply. The proposed development would need to provide a minimum of 188 off-street parking spaces. The Applicant plans to provide approximately 530 spaces and a number of bicycle parking spaces in keeping the DDOT standard of five percent (5%) of the required auto parking. It is therefore anticipated that the proposed parking would satisfy the zoning requirements and prevent spill over from the site to the adjacent residential and commercial properties and neighborhood streets.

Table 5 – Parking Requirements and Provisions

Land Use	Required Park Per C-2-B Zor	Proposed Parking		
	Ratio	Required	Farking	
- Retail (52,100 GSF)	1 per 750 SF in excess of 3,000 SF	65	170	
 Apartments (368 Units) 	1 per 3 Units	123	360	
Total		188	530	





Figure 9 – Proposed 8th and H Streets NE Site Plan

GS



Loading Berths and Truck Movements

The required and proposed loading requirements are compared in Table 6. The table indicates that the proposed loading facilities would be adequate to satisfy the needs of the project. The project would be designed to prevent front loading by providing rear service access via an existing alleyway between 8th and 10th Streets. The Applicant would also collaborate with DDOT in the provision of signs prohibiting loading operations along the adjacent streets. Adequate turning radii and maneuvering space would be provided to ensure that delivery trucks enter the site, maneuver into loading areas and exit the site efficiently without adverse impacts on automobile and pedestrian traffic movements on the site and along the adjacent public streets.

Table 6 - Loading Requirements and Provisions

Loading Facility	No. Required	No. Provided
- 20 ft deep berth	2	4
 30 ft deep berth with 100 SF Platform 	1	2
 55 ft deep berth with 200 SF Platform 	2	2

8th and H Streets NE PUD Trip Generation

The number of anticipated vehicle trips to be generated by the PUD was estimated based on data provided in the ITE's *Trip Generation*, 7th Edition; WMATA's *Development-Related Ridership Survey*, 2005 and the trip generation of the existing shopping center as indicated by traffic turning movement counts at the site entrances.

The ITE rates and equations were used to generate trip estimates for the proposed buildings; however reductions were made for alternate mode use based on WMATA's *Development-Related Ridership Survey*, 2005. According to the rates and equations provided by ITE, the proposed development, consisting of 409 apartment units and 50,500 SF of retail, would generate a total of 308 AM peak hour trips (104 in and 204 out), 642 PM peak hour trips (350 in and 292 out), and 6,966 daily trips. This is without consideration to any reduction in the trips as a result of its proximity and access to transit, synergy between various on-site uses, and reduction for the existing retail trips.

<u>Trip Generation of Existing Retail Uses</u>. The site is improved with approximately 37,780 SF of retail space. Since the existing uses are currently generating trips, and these trips will be replaced by the trips generated by the retail portion of the proposed PUD, then a trip reduction equivalent to the existing trips is warranted.

Trip generation rates were estimated for the existing retail use from the existing turning movement counts at the site's access points. The counts indicate that the existing development generates a total of 68 AM peak hour trips (34 in and 34 out), 156 PM peak hour trips (81 in and 75 out).

The existing trips estimated from the turning movement counts at the driveways were deducted from the ITE estimates, since these would not be new trips. These reductions, shown in the site trip



generation of Table 7 at page 28, were also distributed throughout the network based on ingress and egress travel patterns. These trips are shown in Figure 10.

<u>Synergy Reductions</u>. According to ITE, some trips between various land uses in multi-use developments are made internally by walking or driving on interior roadways and do not affect the major street system. This relates to the proposed PUD, as residents of the apartments may be patrons of the retail uses. Synergy reductions were calculated for the afternoon peak hours using the internal capture rates published in the *ITE Trip Generation Handbook*. Table 7 shows the synergy reductions.

<u>Transit Reductions</u>. The WMATA *Development-Related Ridership Survey 2005* provides a good look at the travel patterns within the Washington DC Metro region. The survey confirmed previous findings that the walking distance between a site and transit locations, primarily a Metrorail station, influences the mode of commute. The WMATA study provides regression equations relating the distance (from the station) to mode split. Retail and residential transit reductions were calculated independently. The proposed development is located approximately ³/₄ of mile away from Union Station. Using the regression equations provided for residential and retail, in the interest of maintaining a conservatively high estimate of trips, and with anticipated improvements in the transit service near the site, a 40% transit reduction was applied to residential trips and 25% reduction was applied to retail trips. This reduction is shown in Table 7 on page 28.

<u>Pass-by/Diverted Link Reductions</u>. According to ITE's *Trip Generation Handbook*, 2^{nd} Edition, retailoriented developments such as shopping centers are often located adjacent to busy streets in order to attract the motorists already on the street. These sites attract a portion of their trips from traffic passing the site on the way from an origin to an ultimate destination.

The 8th and H Streets NE PUD fronts on the busy H Street Corridor and is expected to attract motorists that commute to and from the Washington DC business district. These commuters may decide to utilize the retail uses of the proposed development. Based on information provided in ITE's *Trip Generation Handbook*, 2nd Edition and studies conducted by Gorove/Slade Associates, Inc. a 25% reduction was applied to afternoon weekday trips to account for these trips. This is shown in Table 7 on page 28. Figure 11 shows the pass-by/diverted link trips.

Based on the above trip-reduction considerations, the proposed development would generate 149 net/new trips during the AM peak hour and 271 vehicle trips during the PM peak hour. The projected total and net trip generation estimates are presented in Table 7 on page 28.

[The Applicant has revised the site development program to include 368 apartment units and 52,000 SF retail space. This program would result in 139 net/new trips during the AM peak hour and 262 vehicle trips during the PM peak hour. Since this trip generation is less compared with the initial program, the trip generation for the initial program (shown in Table 7) was analyzed taking a conservative (high side) approach.]



Figure 10 – Existing Site Trips Removed from the Study Area



Figure 11 – Pass-By Trips

Trip Distribution

The site-generated traffic volumes reflected in Table 7 were assigned to the public roadway network based on existing commuter travel patterns identified during data collection and general knowledge of the area. The percent distributions and the resulting trip assignments are shown in Figure 12.

			Trip Generation						
8 th & H Streets NE PUD Component	ITE Code	Amount	/	AM Peak H	our	PI	A Peak Ho	our	Daily
r eb component			In	Out	Total	In	Out	Total	Total
Residential									
Apartments	220	409 Units	41	163	204	158	85	243	2,610
Retail Synergy						<u>-25</u>	<u>-17</u>	<u>-42</u>	-436
Residential Subtotal			41	163	204	133	68	201	2,174
40% Transit reduction			<u>·16</u>	<u>-65</u>	<u>-82</u>	<u>-53</u>	<u>-27</u>	<u>-80</u>	<u>-870</u>
Residential Total			25	98	122	80	41	121	1,305
Retail									
Shopping Center	820	51,000 SF	63	41	104	192	207	399	4,356
Residential Synergy						<u>-17</u>	<u>-25</u>	<u>-42</u>	-436
Retail Subtotal 1			63	41	104	175	182	357	3,920
Existing Retail Trips			<u>-34</u>	-34	<u>-68</u>	<u>-81</u>	<u>-75</u>	<u>-156</u>	<u>-1,734</u>
Retail Subtotal 2			29	7	36	94	107	201	2,186
25% Transit reduction			<u>-7</u>	<u>-2</u>	<u>.9</u>	<u>-23</u>	<u>-27</u>	<u>-50</u>	<u>-547</u>
Retail Total			22	5	27	70	80	151	1,640
Total (NET NEW TRIPS)			47	103	149	150	121	271	2,944
Total (No Reductions)			104	204	308	350	292	642	6,966

Table 7 - 8th and H Streets NE PUD Trip Generation

Source: *Trip Generation Manual, 7th Edition,* Institute of transportation Engineers (ITE), 2003. Note: The AM Peak Hour and PM Peak Hour refer to the respective Peak Hour of Adjacent Street Traffic between 7 - 9 am and 4 - 6 pm.

Total Future Traffic Forecast

The site-generated traffic assignments depicted on Figure 12 were combined with the background traffic volumes shown on Figure 8 and pass-by trips shown in Figure 11 to yield the total future traffic forecasts associated with the build-out of the proposed development, as shown on Figure 13.



Figure 12 – New Site Generated Trips



Total Future Traffic Analyses

Total future peak hour levels of service (including the build-out of the 8th and H Streets PUD) were calculated based on: (1) existing lane use and traffic controls shown on Figure 5; (2) the total future traffic volumes shown on Figure 13; and (3) the *Highway Capacity Manual 2000 (HCM)* methodologies (using Synchro 6 software). Copies of LOS calculation worksheets are included in the Appendix D.

Table 8 displays the results of the capacity analyses, including LOS and average delay per vehicle (in seconds). The results indicate that all study intersections would continue to operate acceptably in the AM and PM peak hours. This indicates that the proposed development would have minimal impacts on the local area roadway network. Further analysis show that these impacts would be mitigated fully with signal timing improvements. Table 9 (at page 32) shows the levels of service results with these signal timing improvements.

	Total Future Conditions					
Intersection (Approach)	AM Pe	ak Hour	PM Pe	eak Hour		
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service		
8 th Street NE and H Street NE						
Overall	13.2	В	47.0	D		
Eastbound	7.1	А	19.2	В		
Westbound	4.1	А	4.6	А		
Northbound	44.7	D	47.7	D		
Southbound	55.2	E	251.3	F		
9th Street NE and H Street NE		·				
Overall	4.5	Α	4.1	Α		
Eastbound	3.0	А	3.2	А		
Westbound	4.4	В	3.1	A		
Southbound	33.6	С	35.5	D		
10 th Street NE and H Street NE						
Overall	16.5	В	10.2	В		
Eastbound	2.4	А	3.2	А		
Westbound	18.3	С	9.0	А		
Northbound	36.8	D	44.8	D		
Southbound	32.0	С	38.5	D		
10th Street NE and G Street NE						
Overall	9.6	Α	8.4	Α		
Westbound	10.3	В	8.4	A		
Northbound	9.1	А	8.5	А		
Southbound	8.7	А	8.2	А		
8 th Street NE and G Street NE						
Overall	14.9	В	13.0	В		
Westbound	16.4	С	11.0	В		
Northbound	14.9	В	12.0	В		
Southbound	12.7	В	14.6	В		
10th Street NE and Service Alley East						
Eastbound	9.7	А	10.0	А		
8th Street NE and Service Alley West						
Westbound	13.2	В	21.0	С		

Table 8 – Total Future Levels of Service



Figure 13 – Total Future Traffic



Table 9 – Total Future Levels of Service with Improvements

	Total Future Conditions (Signals Optimized)					
Intersection (Approach)	AM Pe	ak Hour	PM Pe	eak Hour		
	Delay (sec/veh)	Level of Service	Delay (sec/veh)	Level of Service		
8 th Street NE and H Street NE						
Overall	12.5	В	27.7	С		
Eastbound	9.1	А	32.2	С		
Westbound	6.2	А	7.2	A		
Northbound	37.0	D	32.2	С		
Southbound	37.3	D	43.1	D		
9 th Street NE and H Street NE						
Overall	4.6	Α	4.4	Α		
Eastbound	3.1	А	2.9	А		
Westbound	4.5	А	5.2	А		
Southbound	33.6	С	29.4	С		
10 th Street NE and H Street NE						
Overall	12.7	В	9.7	Α		
Eastbound	2.6	А	2.2	А		
Westbound	12.3	В	14.8	В		
Northbound	45.8	D	30.6	С		
Southbound	37.0	D	29.2	D		
10th Street NE and G Street NE						
Overall	9.6	Α	8.4	Α		
Westbound	10.3	В	8.4	А		
Northbound	9.1	А	8.5	А		
Southbound	8.7	А	8.2	А		
8 th Street NE and G Street NE						
Overall	14.9	В	13.0	В		
Westbound	16.4	С	11.0	В		
Northbound	14.9	В	12.0	В		
Southbound	12.7	В	14.6	В		
10 th Street NE and Service Alley East						
Eastbound	9.7	А	10.0	А		
8th Street NE and Service Alley West						
Westbound	13.2	В	21.0	С		

CONCLUSIONS

The capacity analyses contained in this preliminary study provided the following results:

• Existing Conditions

Under existing conditions, all study area intersections operate at acceptable Levels of Service.

Future Background Conditions

The results of the future background capacity analyses show that all study area intersections are projected to operate at acceptable Levels of Service, with negligible changes in delay, when considering regional growth and traffic from future background developments.

Total Future Conditions

The total future conditions capacity analysis, which includes the net traffic generated by the proposed 8th and H Streets NE, shows that the study intersections would continue to operate at acceptable levels during both the morning and afternoon peak hours. This indicates that the proposed development would have minimal impacts on the study area roadway network. These impacts would be fully mitigated with signal timing improvements.

The City Department of Transportation plans to provide streetcar services along the H Street and 8th Streets corridors, including the subject development site. The proposed development would implement a Transportation Management Plan (Appendix E), in keeping with the City's policies and requirements toward reducing drive alone vehicular trips and increasing use of alternative modes. These provisions would further mitigate the potential traffic impacts of the proposed development.

The proposed development would include sufficient off-street parking to prevent parking overflow onto the adjacent residential streets. The proposed loading facilities would be adequate to satisfy the needs of the project without adverse impacts on the adjacent streets.

Based on the above findings, the proposed 8th and H Streets NE PUD could be developed as planned without having any significant impacts on the surrounding road network. The proposed development would also not be objectionable to adjacent properties and neighborhoods from the perspectives of traffic and parking.