

Feasibility Study

Dorchester Apartment Building

Washington, DC

Prepared for

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INTRODUCTION

This report contains the findings of a traffic impact study conducted for the planned expansion of the Dorchester Apartments within Ward One of the District of Columbia. The site is bounded by Euclid Street to the north, Kalorama Road to the south, 17th Street to the west and 16th Street to the east. The site location and regional roadway network are shown in Figure 1.

The site currently contains a 394 unit apartment building and a 120-space surface parking lot. The planned expansion includes a second apartment building composed of 141 units and a 307 space parking lot. In total, upon build-out in 2006, there will be 535 units and 307 parking spaces.

The following tasks were undertaken as part of this study:

- A scoping meeting was held on May 30, 2003 with the District Department of Transportation to determine the parameters of the study and the intersections to be analyzed;
- Field reconnaissance in the vicinity of the site was performed to collect information related to existing traffic controls, roadway configurations, and traffic flow characteristics;
- Traffic counts were conducted on Thursday, October 24, 2002 during the morning and afternoon peak periods at the intersections of 16th St./Euclid St., 16th St./Kalorama Rd., 17th St./Euclid St., and 17th St./Kalorama Rd.;
- Intersection capacity analysis was performed for existing, no-build (2006) and total future (2006) peak hour traffic conditions at the intersections contained within the study area.

Sources of data for this study include The District of Columbia Department of Transportation (DDOT) and the files and library of Gorove/Slade Associates, Inc.

EXISTING CONDITIONS

Existing Roadway Network

Primary pick-up and drop-off locations associated with the Dorchester Apartments consist of the semi-circular driveway accessed from 16th Street and exiting at Kalorama Road. A 120 space surface parking lot located to the west of the apartment building is accessed from Kalorama Road.

A regional roadway network and site location map is illustrated in Figure 1. The following presents a description of the roadways serving the Dorchester Apartment:



Figure 1
Site Location Map



- 16th Street: 16th Street is a major north-south arterial. In the vicinity of the project site, 16th street is three lanes southbound and two lanes northbound. The intersection of 16th Street and Euclid Street is the only signalized intersection on the block.
- Kalorama Road: Kalorama Road is a two-lane east-west roadway which runs from Columbia Road and terminates at 16th Street. The intersection with 17th Street is controlled with a four-way stop sign. The 16th Street intersections is controlled with one stop sign, and left turns are prohibited during the AM peak hour.
- 17th Street: To the south of Kalorama Road, 17th Street runs one-way north and provides parking on both sides of the street. To the north of Kalorama Road, 17th Street becomes two-way. Intersections of 17th Street with Euclid Street and Kalorama Road are controlled with 4-way stop signs.
- Euclid Street: Euclid Street is a two-way east-west local roadway. The two lane street provides parking spaces on both sides.
- Mozart Street: Mozart Street is a one-way, northbound residential street. It is one-lane with two hour parking on both sides. It extends between Euclid Street and Columbia Road. Mozart Street is not relevant to the traffic study so traffic counts were not conducted for this street.

Traffic Volume

Traffic counts, shown in Figure 2, were performed on October 24, 2002 between the hours of 7:00-9:00 AM and 4:00-6:00 PM. A traffic count on a typical weekday indicated that about 4 vehicles arrive and 23 depart the parking lot during the AM peak hour (8:00-9:00) and 12 vehicles arrive and 10 depart during the PM peak hour (4:30-5:30). This low volume of traffic is an indication of the convenience of public transportation.

Capacity Analysis

Highway Capacity Software (HCS 2000), published by McTrans, was used to determine Levels of Service (LOS) for the study intersections. For four-way intersections, HCS gives an overall LOS for each intersection. For three-way intersections, an overall LOS is not provided since the major approach is always free-flowing. Instead, the intersection summary provides a separate LOS for the major approach without the stop sign, and for the minor approach with the stop sign. Therefore, a separate table is provided for the intersection of 16th Street and Kalorama Road. According to DDOT, a LOS of 'D' is acceptable for Washington, D.C. Results of the analysis are presented in Tables 1a and 1b below.

Table 1a: HCS Analysis Results for Four-Way Intersections

Intersection	Existing Conditions	
	AM	PM
	LOS Delay (sec/veh)	LOS Delay
16th St. / Euclid St. (Signalized)	C 21.1	C 20.2
17th St. / Euclid St. (4-way Stop Controlled)	A 8.0	A 8.3
17th St. / Kalorama Rd. (4-way Stop Controlled)	A 7.7	A 7.6

Table 1b: HCS Analysis Results for Three-Way Intersections

Intersection	Existing Conditions			
	AM		PM	
	major LOS Delay	minor LOS Delay	major LOS Delay	minor LOS Delay
16th St. / Kalorama Rd. (2-way Stop Controlled)	C 18.6	C 23.1	B 10.2	F 50.3

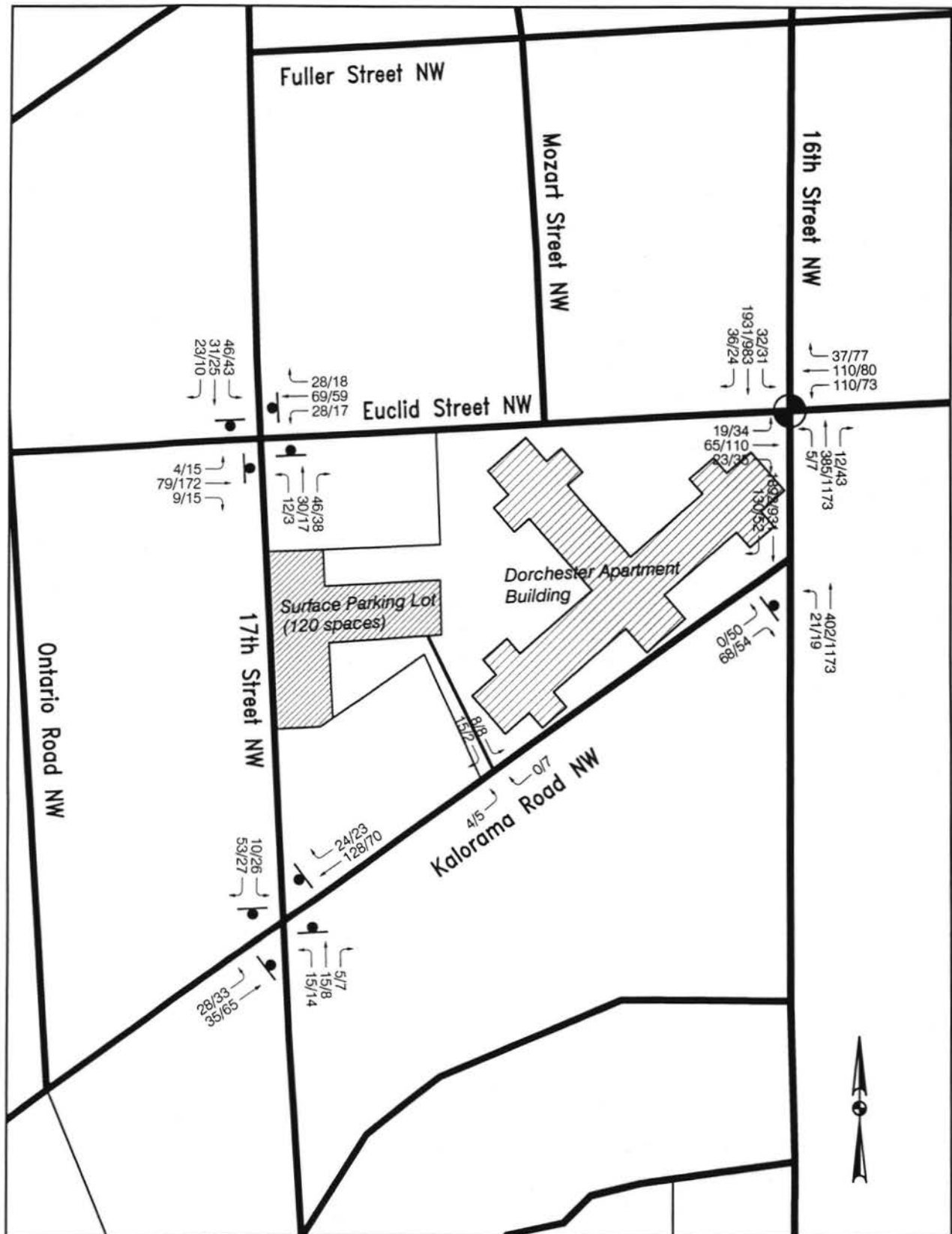


Figure 2
Peak Hour Traffic Volumes Under Existing Conditions (AM Peak/PM Peak)

As Tables 1a and 1b indicate, all intersections operate within acceptable levels except for the intersection of 16th and Kalorama during the PM peak hour. Since Kalorama Road is stop controlled and 16th street is not, vehicles on Kalorama have a long delay. Since the volume of this turning movement is relatively low for this intersection, the long delay for these few vehicles is forgiven. The large majority of the traffic at the intersection operates at very little delay.

NO-BUILD CONDITIONS

Background Developments

DDOT has informed us of two other background developments in the area. One is a 12 dwelling unit apartment with a driveway at 17th Street between Kalorama Street and Euclid Street. The other is called Adam's Row and consists of 68 dwelling units. Adams Row will be located on Champlain Street, only two blocks west of the Dorchester Apartments. The future build year for both of these developments is 2006. As a standard for traffic studies used in the District of Columbia, it is assumed that traffic grows each year by 1%.

Trip Generation

The trips generated by each development were based on trip generation rates presented in the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 6th Edition. ITE trip generation does not account for transit usage. Therefore our estimates are conservative. A summary of the trips is provided in Table 2 below.

Table 2: ITE Trip Generation

	ITE Code	Units	AM			PM		
			Total	In	Out	Total	In	Out
Adam's Row	220	68	37	6	31	56	38	18
12 Unit Apartment	220	12	9	1	8	25	17	8

FUTURE CONDITIONS WITH DEVELOPMENT

Parking and Transit

Limited street parking and a 120 space surface parking lot to the west of the building are currently used to serve the needs of the tenants. The underground Metro station is located three blocks to the North-East at the intersection of Harvard Street and 14th Street. The site also has access to several bus routes along 16th Street.

Site Development Plan

The new apartment building will be located just to the west of the existing Dorchester apartment building on the same block. When complete, it will have 8 floors to accommodate 141 dwelling units, and two parking levels to accommodate 307 parking spaces. Therefore, in the end, the 141 new apartment units will increase the current 394 apartment units to 535 apartment units. The zoning requirements of Washington D.C. specify one parking space per three dwelling units, so the proposed conditions will exceed the requirement.

Trip Generation

Upon comparison with our field counts at the Dorchester Apartments, ITE's Trip Generation Manual does not reflect the lack of auto dependency for this urban facility. Commuters living in this area have several public transit opportunities, including Metrobus and Metrorail. Therefore, trips generated for the new Dorchester Apartments were proportionally related to the number of existing parking spaces. This relationship was used to generate new trips based on the number of parking spaces. Table 3 presents a summary of the calculations.

Table 3: Trip Generation for Dorchester Apartments

	AM	PM
Existing Field Conditions	Volumes	
Parking Spaces: 120	27	22
	Percent Distribution	
	0.23	0.18
Future Trip Distribution	Volumes	
Parking Spaces: 307	71	55

Trips generated were then divided between inbound and outbound traffic. Once again, this was done proportionally based upon existing traffic counts.

Table 4: Proportional Distribution of Development Site Trips

AM INBOUND:	11
AM OUTBOUND:	60
PM INBOUND	30
PM OUTBOUND	25

Direction of Approach (DOA)

DOAs were determined by distributing traffic patterns proportionally based on existing traffic volumes. DOA percentages for the Dorchester Addition are shown in Figure 3 and those for the two background developments are shown in Figure 4. Volumes generated by the Dorchester Addition are shown in Figure 5 and volumes generated by the background developments are shown in Figure 6.

Future projections of traffic were determined. Figure 7 shows the No-Build condition, and Figure 8 shows the Total Future condition.

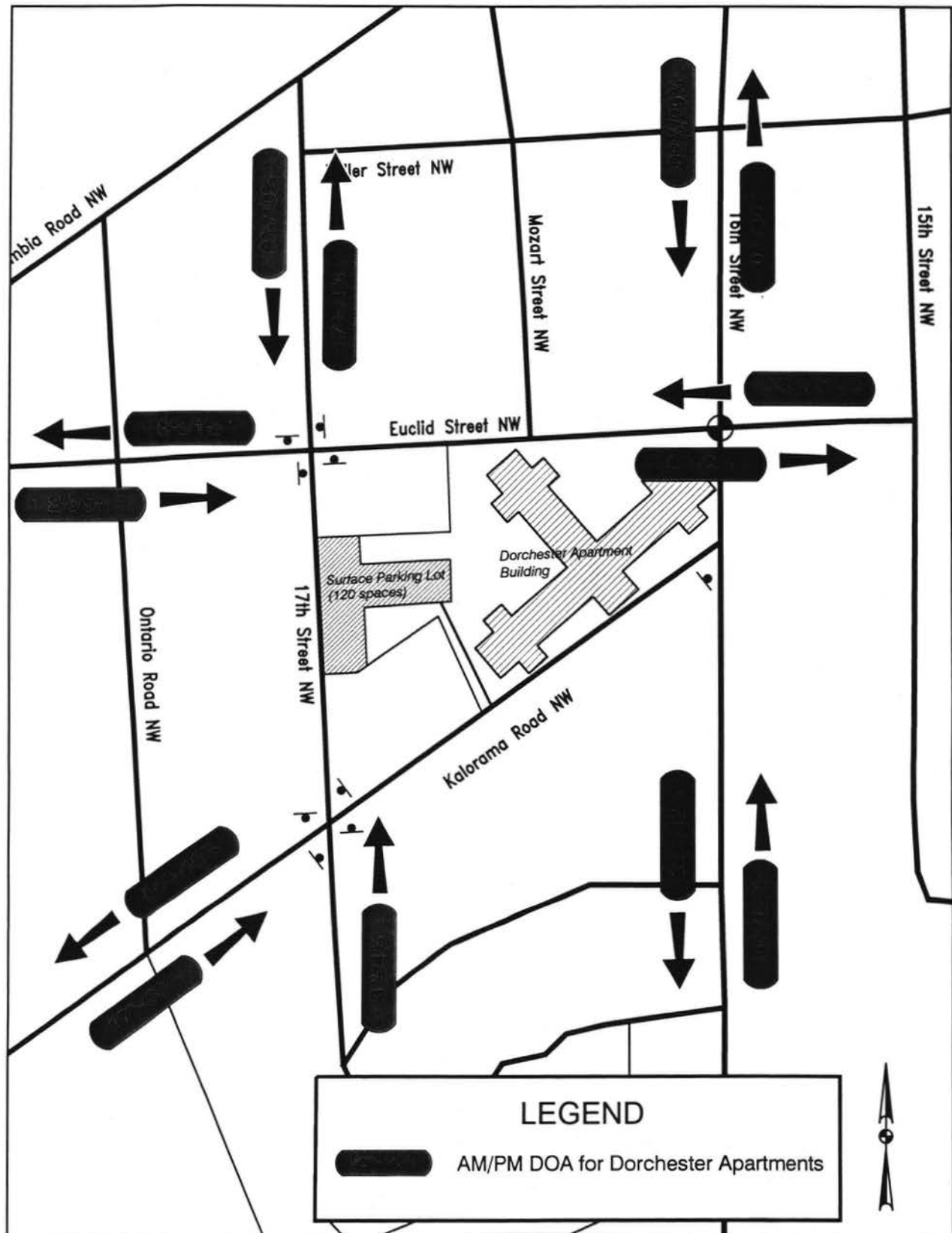


Figure 3
Directions of Approach for Dorchester Apartments

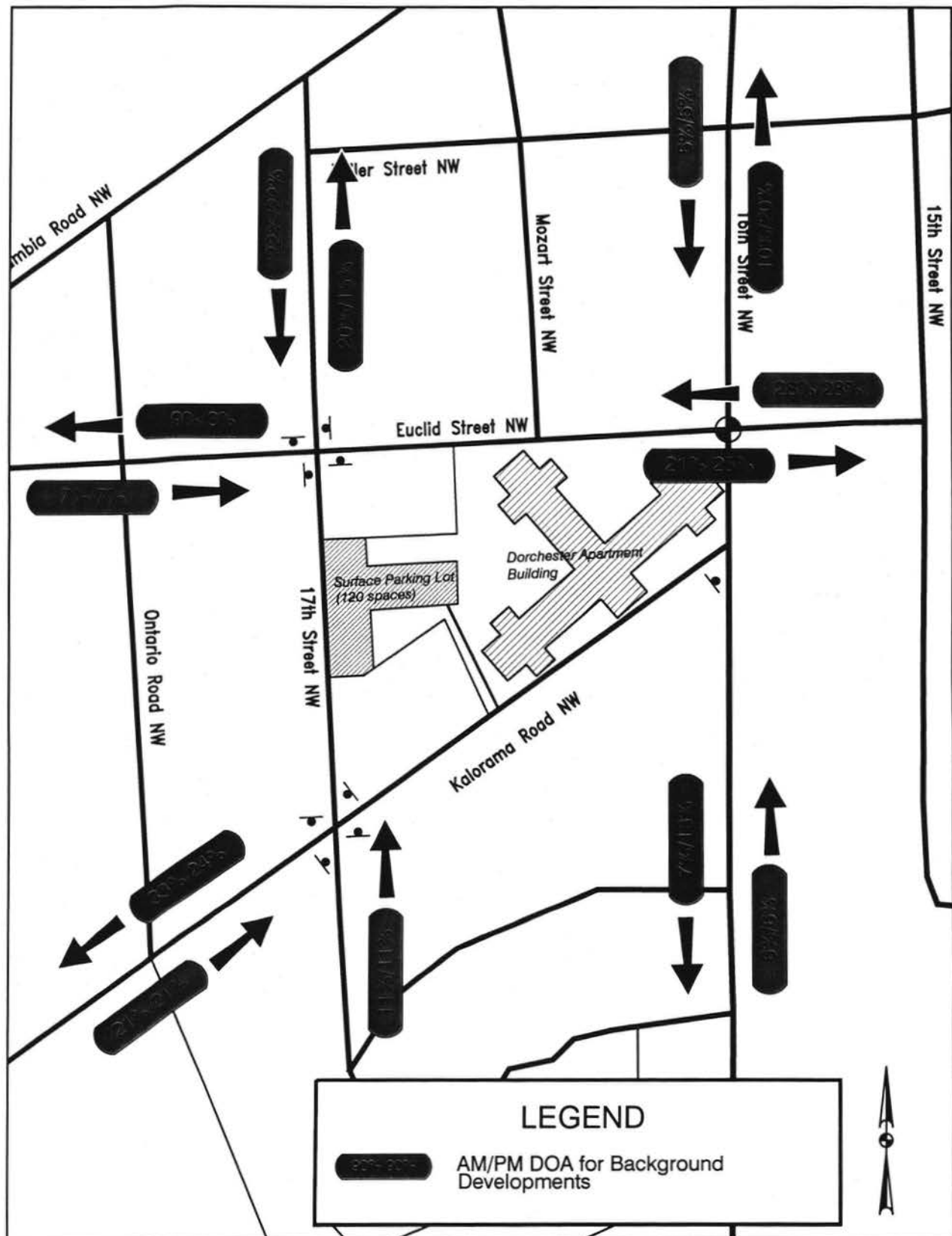


Figure 4
Directions of Approach for Background Developments

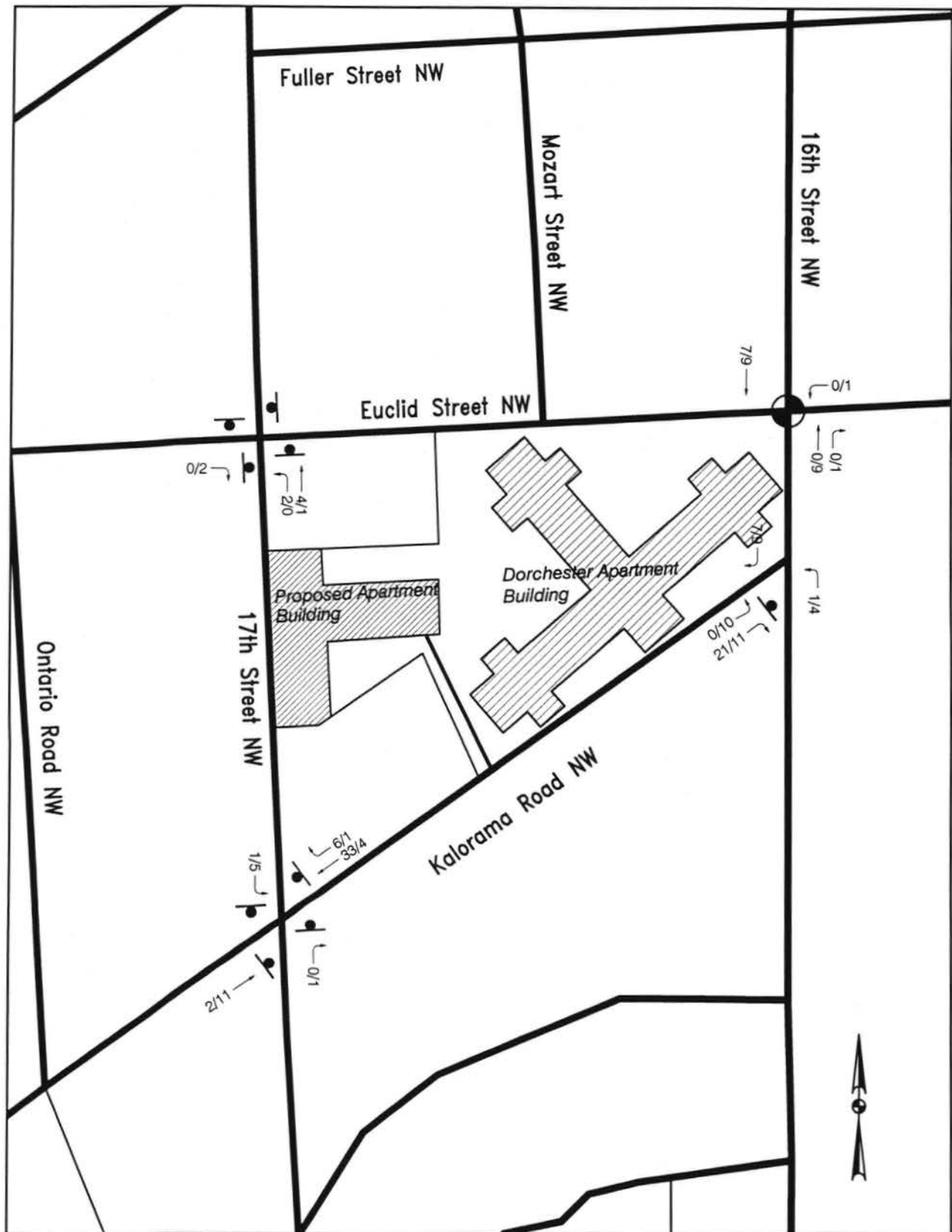


Figure 5
Peak Hour Traffic Volumes Generated by Dorchester Apartments (AM Peak/PM Peak)

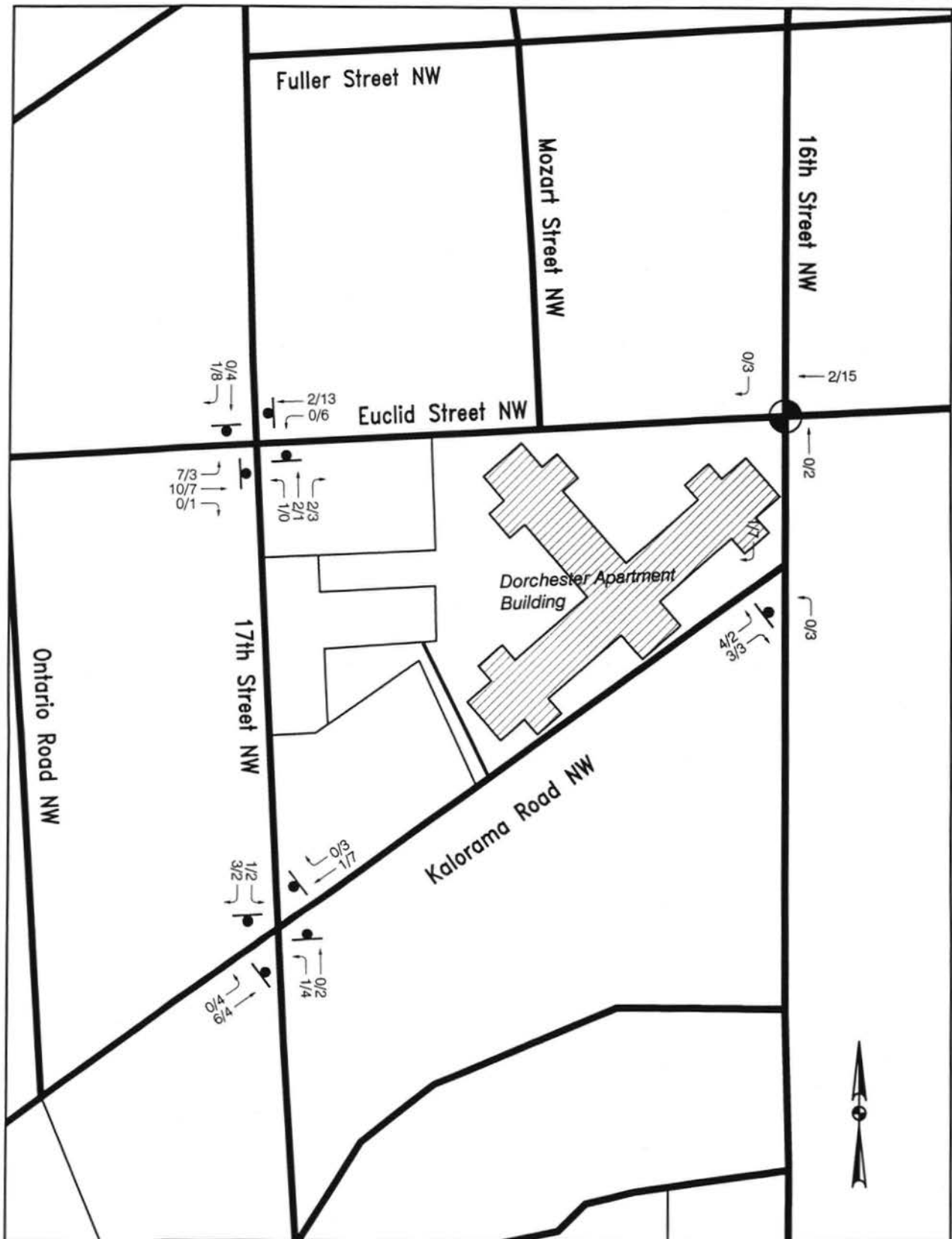


Figure 6
Peak Hour Traffic Volumes Generated by Background Development Sites (AM Peak/PM Peak)

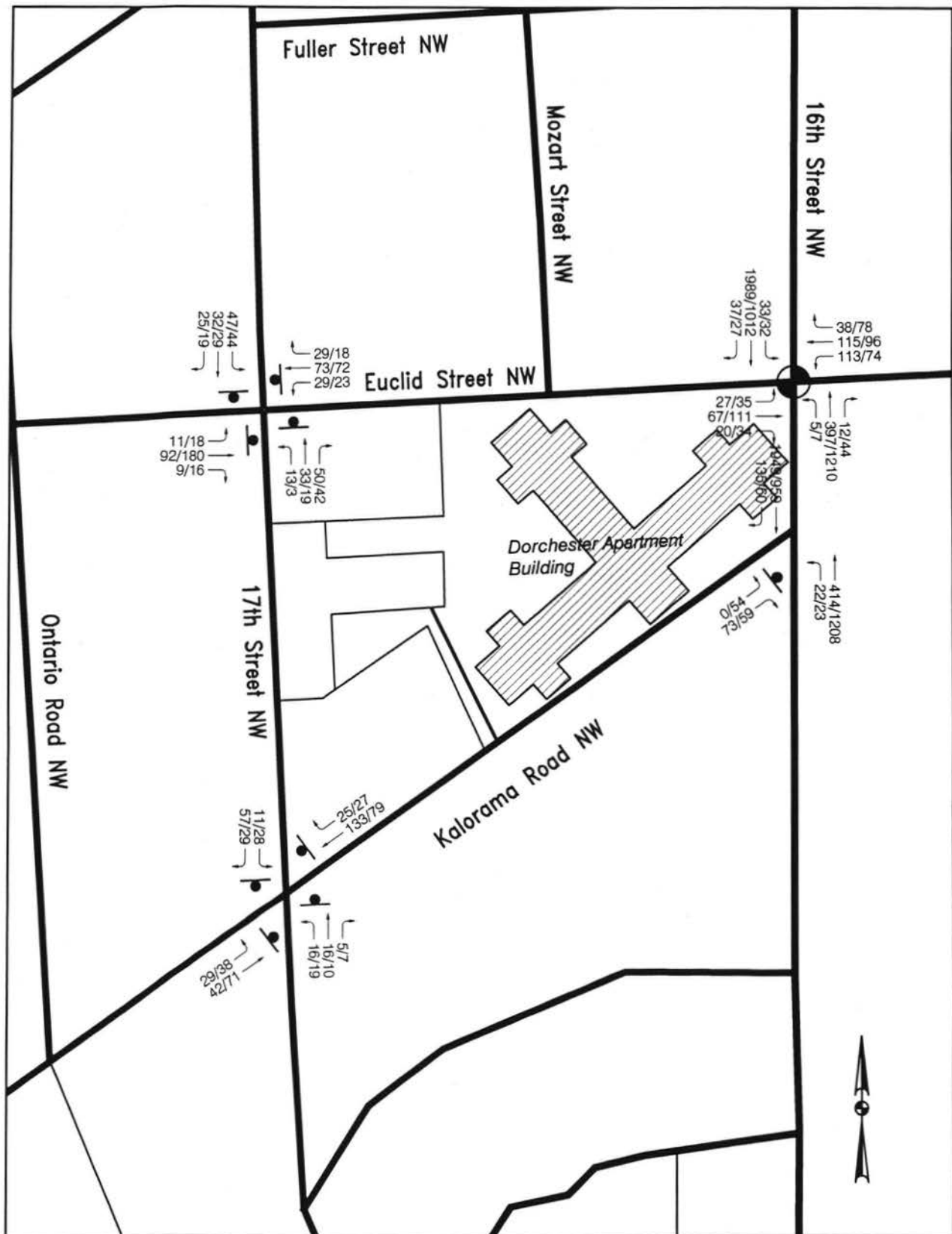


Figure 7
Peak Hour Traffic Volumes Under No-Build Conditions (AM Peak/PM Peak)

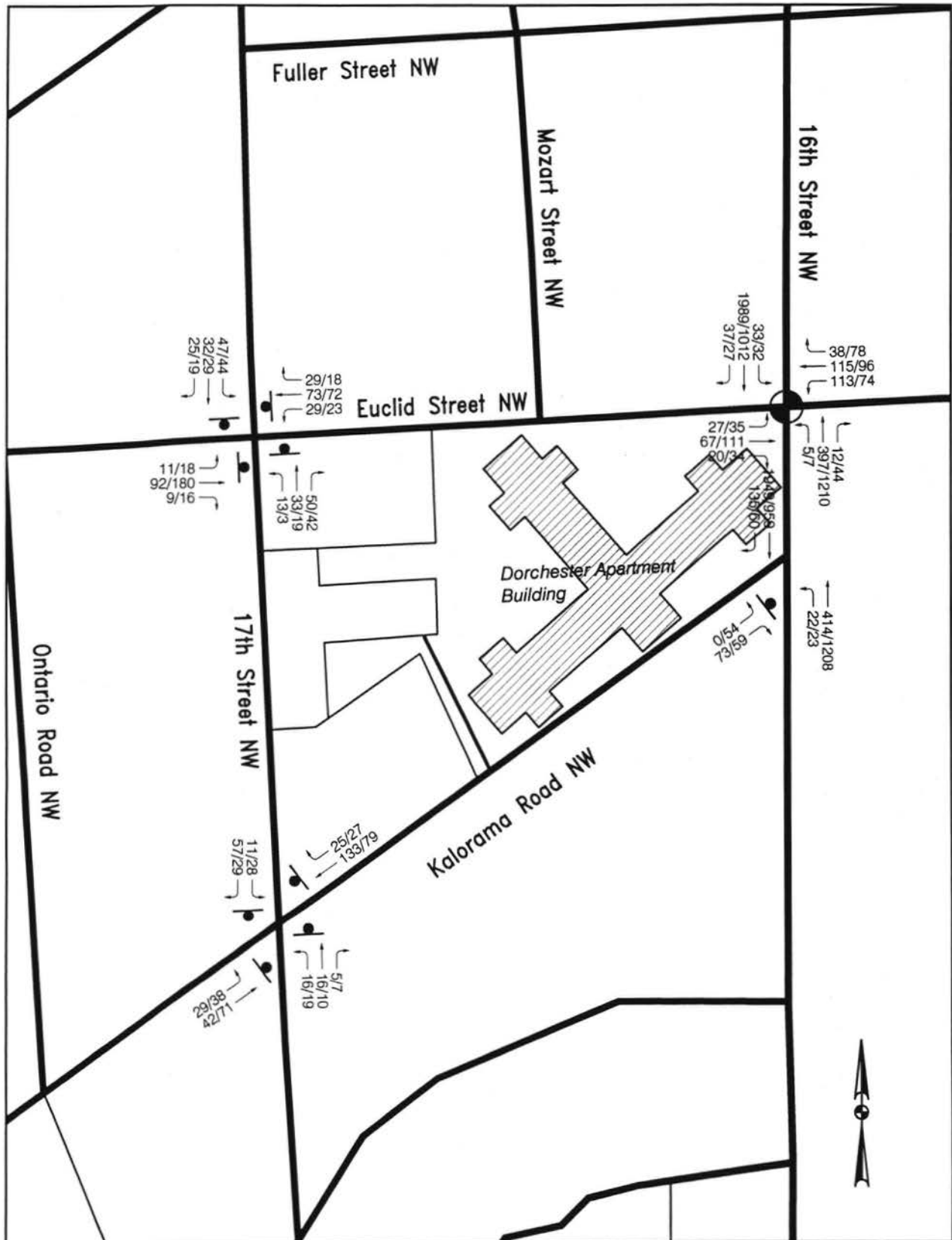


Figure 8
Peak Hour Traffic Volumes Under Total Future Conditions (AM Peak/PM Peak)

CAPACITY ANALYSIS

A comparison of the HCS analysis under existing conditions, future no-build conditions, and total future conditions is presented in Tables 5a and 5b.

Table 5a: Results of HCS Analysis for 4-Way intersections

Intersection	Existing Conditions		Future No-Build Conditions		Total Future Conditions	
	AM LOS	PM LOS	AM LOS	PM LOS	AM LOS	PM LOS
	Delay (sec/veh)	Delay	Delay	Delay	Delay	Delay
16th St. / Euclid St. (Signalized)	C 21.1	C 20.2	C 22.9	C 22.4	C 23.2	C 22.4
17th St. / Euclid St. (4-way Stop Controlled)	A 8.0	A 8.3	A 8.2	A 8.5	A 8.2	A 8.5
17th St. / Kalorama Rd. (4-way Stop Controlled)	A 7.7	A 7.6	A 8.0	A 7.8	A 8.0	A 7.8

Table 5b: Results of HCS Analysis for 3-Way intersections

Intersection	Existing Conditions				Future No-Build Conditions				Future Conditions			
	AM		PM		AM		PM		AM		PM	
	major LOS Delay	minor LOS Delay	major LOS Delay	minor LOS Delay	major LOS Delay	minor LOS Delay	major LOS Delay	minor LOS Delay	major LOS Delay	minor LOS Delay	major LOS Delay	minor LOS Delay
16th St. / Kalorama Rd. (2-way Stop Controlled)	C 18.6	C 23.1	B 10.2	F 50.3	C 19.5	C 24.7	B 10.4	F 64.3	C 19.7	D 27.1	B 10.5	F 82.8

As the tables indicate, the LOS does not change dramatically under any scenario. The biggest change is during the PM peak hour of 16th St/ Kalorama Rd., where the average vehicle on the minor approach may be delayed an additional 18.5 seconds from no-build conditions. Once again, this approach represents a small minority of traffic and the large majority of the traffic at the intersection operates at very little delay.

CONCLUSIONS

- The existing traffic generated by Dorchester Apartments is relatively small at 27 AM peak hour and 22 peak hour trips.
- Existing site trip generation was used to project an increase of 44 AM peak hour trips and 33 PM peak hour trips for the proposed expansion.
- The capacity analysis shows that the additional trips generated by the expansion of Dorchester Apartments will not noticeably affect the operations of the study intersections. Three of the four study intersections will continue to operate at LOS D or better. The intersection of 16th Street and Kalorama Road will operate acceptably along the major roadway of 16th Street. The minor approach will operate at LOS F as it does today during the PM peak hour. Average delay per vehicle for this approach will increase by approximately 18.5 seconds per vehicle from the no-build condition.