

Traffic Impact Study

Dorchester Apartments

Washington, DC

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EXECUTIVE SUMMARY

The following report presents traffic impact analysis findings and additional studies for the expanded development of Dorchester Apartments located in the Reed Cooke neighborhood of Washington, DC. Significant study has been performed for the neighborhood related to the application for the proposed Citadel project, which is adjacent to the Dorchester Apartments and will include a grocery store, office and retail. In response to the Citadel PUD application, the ANC has recommended and DDOT has concurred with changing portions of the street network to one-way operation and installing a traffic signal at the 16th Street and Kalorama Road intersection. However, the street traffic patterns and intersection controls as they exist today were assumed for this analysis in that plans for future improvements have not been finalized.

Based on the analysis, the following major conclusions were determined:

Existing (2005) Traffic Conditions

The capacity analyses show that the intersections currently operate at acceptable levels of service during peak hours with the following exceptions: the eastbound approach of Kalorama to 16th Street in the AM and PM, the eastbound approach of Euclid Street to 16th Street in the PM and the westbound approach of Euclid to 16th in both the AM and PM.

Future Background (late 2007/ early 2008) Conditions

The future background capacity analyses show that the intersections are expected to operate at acceptable levels of service during peak hours with the exception of the side street approaches to the intersections on 16th Street that experience excessive delays in the existing condition. Traffic on the eastbound approach to the unsignalized intersection of Kalorama Road and 16th Street will be especially impacted by this background growth. These impacts can be mitigated with a traffic signal at the intersection and this signal will need to be timed and coordinated with existing signals at nearby intersections of 16th Street with Euclid Street and Crescent Place.

Build Year (late 2007/ early 2008) Conditions

The total future capacity analyses show that the intersections at build year conditions will operate at acceptable levels of service during peak hours with the exception of the intersections of Euclid and 16th Streets and Kalorama Road and 16th Street. The traffic impact on the eastbound approach to the intersection of Euclid and 16th Streets can be mitigated with adjustments to the signal timings at this intersection. These timing adjustments will need to be coordinated with other signals on 16th Street to ensure that the progression of traffic along this major north-south corridor is not affected. If the intersection of Kalorama Road and 16th Street were signalized as described above, then the intersection will continue to operate at acceptable levels with the addition of the Dorchester expansion traffic.



Parking

The proposed parking garage will contain 307 parking spaces with 8 in tandem. The garage will provide one parking space per unit for the 143 new apartments and will replace the 120 parking spaces in the existing surface lot. The remaining spaces will be provided for other users. The proposed parking supply is expected to adequately serve the existing building and the future expansion with no adverse impacts to street parking in the neighborhood.

Loading Dock

The existing loading dock with access from Kalorama Road will operate as it does today. A second loading dock is proposed in the expansion to be located adjacent to the upper level parking garage entrance and to be accessed from 17th Street. This dock will accommodate trucks up to 45 feet in length. Depending on the direction of arrival, as many as 4 on street parking spaces may need to be removed in order to accommodate the maneuvering of the truck into and out of the loading dock.



INTRODUCTION

This report presents the results of a traffic impact analysis conducted for the planned expansion of the Dorchester Apartments located in the Adams Morgan neighborhood of Washington, DC. 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 395 unit apartment building and a 120 space surface parking lot. The planned expansion includes a second apartment building composed of 140 to 145, or about 143, units and a 307 space parking garage. Access to the new parking garage will be provided by an existing entrance on Kalorama Road and a new entrance on 17th Street. In total, upon build-out in late 2007/early 2008, there will be about 538 units and 307 parking spaces.

This traffic impact analysis serves to replace a previous report prepared by Gorove/Slade Associates, Inc. (G/SA) in 2003 as part of the site approval process. An update is necessary due to additional background developments in the neighborhood and the base traffic data being out dated.

Before starting the revised traffic analysis, G/SA interacted with the District Department of Transportation (DDOT) staff to establish the scope, assumptions, and analysis methodologies of this report, outlined below.

- The study area was set as the following four intersections (same as the 2003 report): Euclid Street and 16th Street; Euclid Street and 17th Street; Kalorama Road and 16th Street; and Kalorama Road and 17th Street.
- The traffic counts from the 2003 report could not be used for new analysis. New counts were collected in March 2005.
- Future traffic in the area was projected using a regional growth percentage of 1% per year for three years in addition to the expected traffic that will be generated by local approved developments. The local developments whose traffic is expected to pass through study intersections are: 1700 Kalorama Lofts; Adam's Alley; Jemal's Wheel (1701 Kalorama); Meridian Crescent; Adam's Row; and the Citadel.
- Traffic generated by the Dorchester Apartments expansion was estimated based on the existing traffic volumes and number of parking spaces.

The following tasks were completed as part of this study:

- A site visit was performed recording lane configurations, traffic controls, and signal timings.

- Turning movement counts were conducted at the four study intersections.
- Peak hour traffic volumes were compiled for three scenarios: Existing; Future Background; and Total Future. The scenarios are as follows:
 - Existing: represents current conditions in the study area and is based on the turning movement counts and the site visit.
 - Future Background: represents future (2008) conditions in the study area without the Dorchester Apartments expansion and is based on the existing conditions plus regional, local growth (approved local developments), and future transportation improvements.
 - Total Future: represents future (2008) conditions with the Dorchester Apartments expansion and is based on the future background conditions with the inclusion of traffic generated by the Dorchester Apartments expansion.
- Capacity analyses of the three scenarios were analyzed with Highway Capacity Manual methodology using the Highway Capacity Software 2000 (HCS 4.1e).
- The results of the capacity analyses were used to recommend measures, if necessary, to mitigate the impacts of assumed background development and the Dorchester Apartments expansion.
- On site parking conditions for the pre-expansion and post-expansion scenarios were reviewed.
- Truck maneuvering analysis was performed for the new loading dock using AutoTurn truck maneuvering simulation software.

The proposed Citadel project adjacent to the Dorchester Apartments is currently in the PUD application process. This project is an adaptive reuse of the structure located at 17th Street and Kalorama Road, directly south of the proposed Dorchester expansion. The Citadel will include a grocery store, office and retail. Significant study has been performed for the neighborhood in response to ANC concerns about increased vehicular and truck traffic resulting from redevelopment of the Citadel. The ANC has stipulated changes to the street network must be made and has documented such in an MOU agreement between the developers of the Citadel and the ANC. DDOT has recommended changing Kalorama one-way westbound from 16th Street to 17th Street and making 17th Street one-way northbound from Kalorama Road to Columbia Road. It is already one-way northbound south of Kalorama Road. DDOT has also recommended the installation of a traffic signal at 16th Street and Kalorama Road. These changes to the network have not been finalized therefore existing street traffic patterns and intersection controls were assumed for this analysis.

EXISTING ROADWAY NETWORK

The following is a description of roadways within the study area (see Figure 2 for existing lane configurations and traffic control):

- **16th Street:** 16th Street NW is a major north-south corridor in NW Washington, DC. In the vicinity of the site, this street consists of two northbound and three southbound travel lanes. This street provides access to the Capital Beltway to the north and Massachusetts Avenue to the south and is served by Metro bus routes S1, S2, and S4. 16th Street is classified as a “Major Arterial” in the District of Columbia’s Functional Classification map.
- **Kalorama Road:** Kalorama Road is a neighborhood roadway with a 30’ pavement width that serves traffic in both directions with parking on both sides of the street. This roadway intersects 17th Street with an all-way stop-controlled intersection and creates a “T” intersection at 16th Street with stop control on Kalorama. Kalorama Road is functionally classified as a “Local” street.
- **17th Street:** 17th Street is a 30’ roadway with parking on both sides of the street. North of Kalorama Road, this neighborhood roadway operates in both directions and intersects Euclid Street with an all-way stop-controlled intersection and creates a “T” intersection at Columbia Road with stop control on 17th. South of Kalorama Road, 17th Street operates one-way northbound. 17th Street is functionally classified as a “Local” street.
- **Euclid Street:** Euclid Street to the north of the site is a two-way east-west neighborhood street that intersects Columbia Road to the west and 16th Street to the east of the site. Its intersection with 16th is controlled by a traffic signal. Euclid Street is functionally classified as a “Collector” street, meaning it is intended to carry somewhat more traffic than a “Local” street.



Figure 1 – Site Location Map

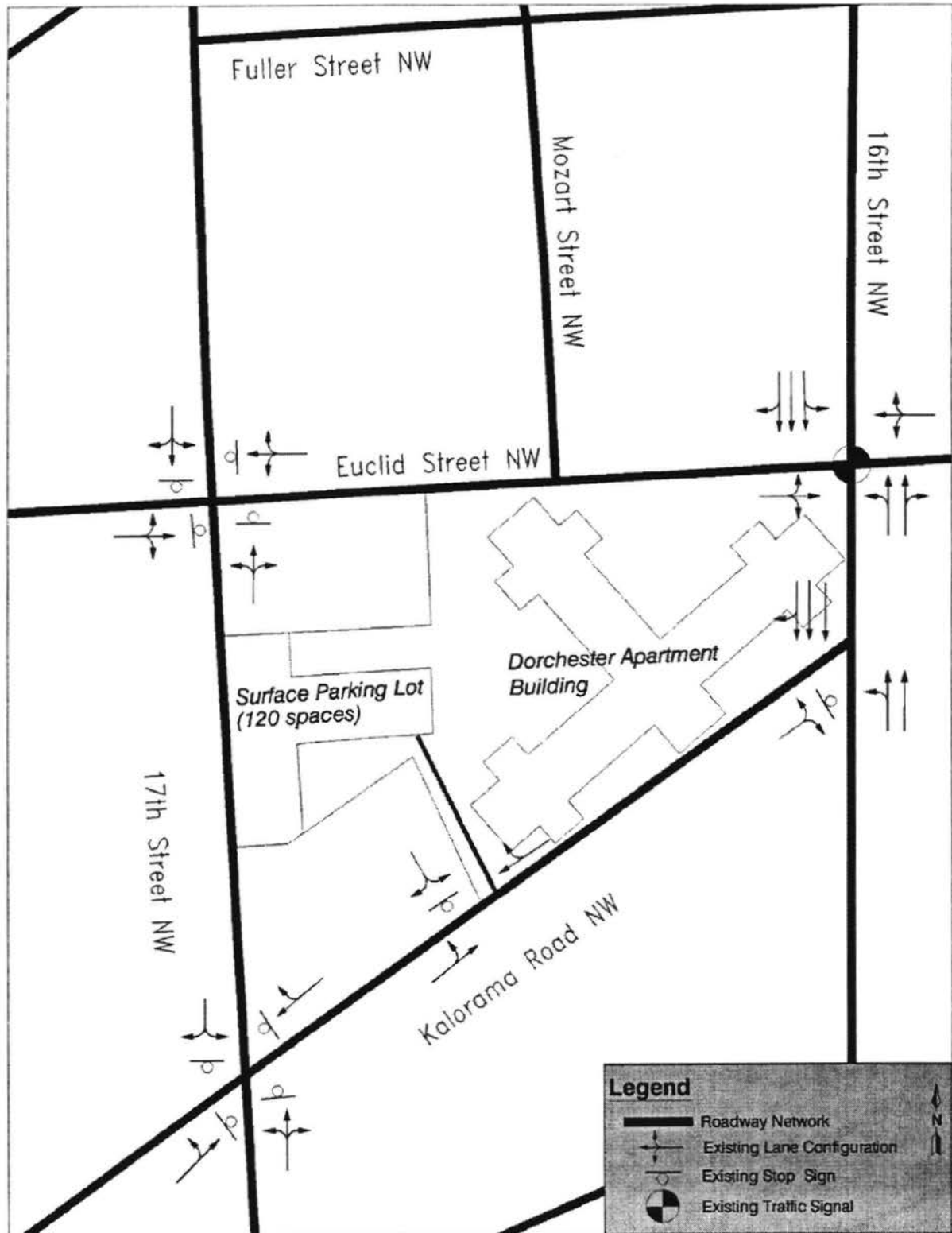


Figure 2 – Existing Lane Configuration and Traffic Control



TRAFFIC VOLUMES

This section of the report describes the methodology used to compile the peak hour traffic volumes for the three scenarios analyzed: (1) existing; (2) future background; and (3) total future.

Existing Volumes

Turning movement traffic counts at the study intersections were collected on Thursday, March 24, 2005 from 7:00 a.m. to 10:00 a.m. and 4:00 p.m. to 7:00 p.m. Based on these counts, the commuter peak hours of the study area were determined to be from 8:00 a.m. to 9:00 a.m. and 5:30 p.m. to 6:30 p.m. Turning movement counts were conducted at the existing site drive on Wednesday, March 16, 2005. This data indicated that on a typical weekday about 18 vehicles arrive and 23 depart during the AM peak hour and 27 vehicles arrive and 19 depart during the PM peak hour. This low volume of traffic is an indication of the convenience of public transportation. The existing peak hour traffic volumes are shown in Figure 3 and count summary sheets are included in Appendix A.

Future Background (2008) Volumes

The future background volumes represent the amount of future traffic the study area should expect without the Dorchester Apartments expansion. The construction of the proposed development is anticipated to be complete in late 2007/early 2008. This neighborhood is currently experiencing a high level of development activity, which will have an impact on traffic volumes in the neighborhood. Some developments were identified in the vicinity of the site that do not currently exist but which are expected to be occupied by 2008. This has been taken in to account for the analysis. The traffic associated with these background developments was determined using the Institute of Transportation Engineers (ITE) *Trip Generation*, 7th Edition for land uses #220 (Apartment), #230 (Residential Condominium/Townhouse), #850 (Supermarket), #814 (Specialty Retail Center) and #710 (General Office Building). Table 1 lists the trip generation for future background developments.

The trips were reduced to reflect the use of public transportation according to the Columbia Heights/Mount Pleasant Transportation Study prepared for DDOT by Cambridge Systematic, Inc. dated July 2003. This study found that within the study area, 44% of residents used public transportation to commute to and from work while the average use of public transit in the District is 33%. The background developments are located outside the report's study area by approximately one block to the south and one block to the west. While the proximity of the developments to the study area of the Cambridge report may warrant a transit reduction of 44%, the District average of 33% was used as a conservative assumption.

Supermarket and specialty retail trips, specifically related to the Citadel development, were reduced 60% to account for a large number of residents within walking distance. This reduction is based on



observations made by G/SA staff at the existing Whole Foods Market grocery store on P Street near Logan Circle. On three separate occasions, the arrival patterns of customers at the P Street Whole Foods store were monitored to determine an appropriate ratio of vehicle to non-vehicle arrivals. These observations found that on a typical weekday, the average percentage of patrons that arrived either on foot or by public transit ranged between 57% and 68%. The remaining patrons arrived by either taxi or personal vehicle. To avoid overestimating the proportion of non-automobile arrivals to the background development, a value at the lower end of the range, 60%, was used in our calculations.

An inherent traffic growth of 1% per year was also assumed to account for other developments in the area that may be completed by the anticipated build year of 2008. The inherent traffic growth and background development trips were added to the existing volumes in order to establish future background 2008 traffic volumes without the Dorchester Apartments expansion site trips. The future background traffic volumes are shown in Figure 4.

Table 1 – Background Development Trip Generation

Land Use	Quantity	Trip Generation					
		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Citadel							
Harris Teeter	43,312 SF	89	57	146	246	236	482
Transit Reduction (60%)		-53	-34	-87	-148	-142	-290
Subtotal		36	23	59	98	94	192
Other Retail	7,458 SF	3	3	6	17	22	39
Transit Reduction (60%)		-2	-2	-4	-10	-13	-23
Subtotal		1	1	2	7	9	16
Office	31,182 SF	65	9	74	19	95	114
Transit Reduction (33%)		-22	-3	-25	-6	-32	-38
Subtotal		43	6	49	13	63	76
Subtotal		80	30	110	118	166	284
1700 Kalorama Lofts	36 units	4	19	23	17	9	26
Transit Reduction (33%)		-1	-6	-7	-6	-3	-9
Subtotal		3	13	16	11	6	17
Adams Alley	22 units	3	12	15	11	6	17
Transit Reduction (33%)		-1	-4	-5	-4	-2	-6
Subtotal		2	8	10	7	4	11
Jemal's Wheel (1701 Kalorama)	48 units	5	24	29	22	11	33
Transit Reduction (33%)		-2	-8	-10	-7	-4	-11
Subtotal		3	16	19	15	7	22
Meridian Crescent	29 units	3	16	19	15	7	22
Transit Reduction (33%)		-1	-5	-6	-5	-2	-7
Subtotal		2	11	13	10	5	15
Adams Row	68 units	6	32	38	29	15	44
Transit Reduction (33%)		-2	-11	-13	-10	-5	-15
Subtotal		4	21	25	19	10	29
Total Proposed Trips		94	99	193	180	198	378

Total Future (2008) Volumes

The total future volumes represent the traffic expected to pass through the study area upon completion of the proposed development. They are based upon the future background volumes with the addition of traffic generated by the Dorchester Apartments expansion distributed through the study area intersections.

Trip Generation and Distribution of Trips

Typically, vehicle trips are generated based on trip generation data compiled from the ITE *Trip Generation*, 7th Edition. If significant non-vehicular transportation modes are expected, as it is in this case, a trip reduction factor may be applied. In the Traffic Volumes section of this report, it was established that a 33% reduction of calculated trips using ITE methodology is a reasonable reduction for this location. Using ITE, the new trips are calculated to be 50 and 65 in the AM and PM, respectively, with the 33% transit reduction.

For the purposes of comparison, trips were generated using the existing traffic produced by the Dorchester Apartments. A proportional relationship was established between the existing number of parking spaces and the observed traffic volumes. This relationship was used to generate new projected volumes. This method resulted in a new trip generation of 63 AM and 71 PM new trips for the Dorchester with the expansion. These volumes are greater than the volumes calculated using the ITE methodology. Therefore, the methodology based on existing traffic patterns is more conservative than using the ITE values and assuming a 33% reduction. The more conservative volumes were used in this analysis. Table 2 shows how the G/SA method contrasts with the values obtained using the ITE *Trip Generation*, 7th Edition. A summary of the trip generation calculation values is included in Appendix B.

The existing vehicle trips were redistributed between the two future garage access points and propagated through the roadway network. The new projected trips were similarly distributed. The distribution of these trips for the Dorchester after its expansion is shown in Figure 5 as percentages of the total. Projected volumes for the Dorchester after expansion, including the redistributed existing trips and new trips, are shown in Figure 6. Future projections of traffic for the Total Future condition are shown in Figure 7.

**Table 2 – Comparison of Trip Generation with ITE**

Description	Trip Generation					
	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
ITE New Trips for 145 Dwelling Units – no mode split adjustment	15	60	75	63	34	97
(33% transit reduction)	(5)	(20)	(25)	(21)	(11)	(32)
Total New Trips per ITE methodology	10	40	50	42	23	65
Total New Trips using Existing Pattern	28	35	63	42	29	71
Difference	+18	-5	+13	0	+6	+6

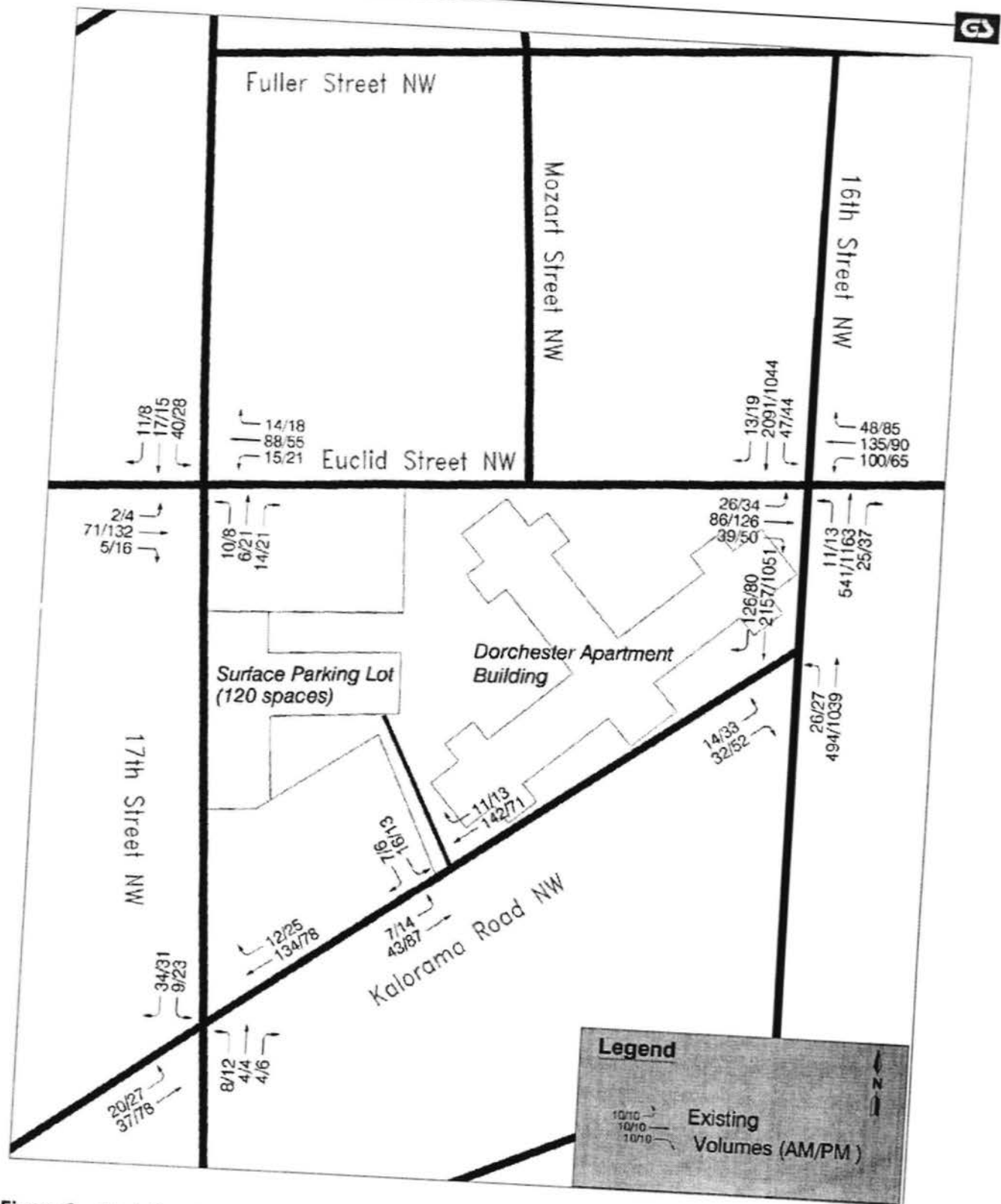


Figure 3 – Peak Hour Traffic Volumes for Existing Conditions (AM Peak/PM Peak)

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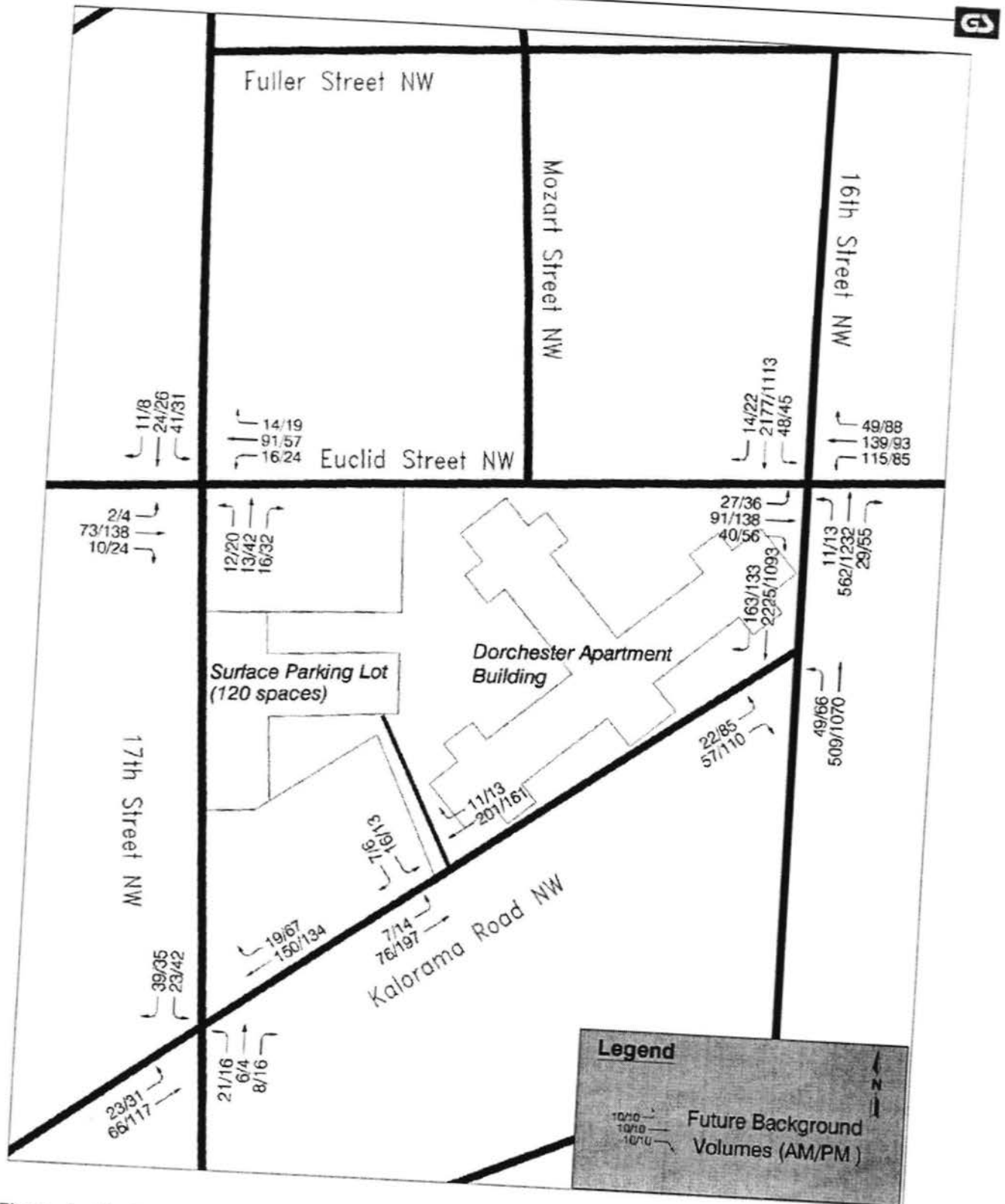


Figure 4 – Peak Hour Traffic Volumes for Future Background Conditions (AM Peak/PM Peak)

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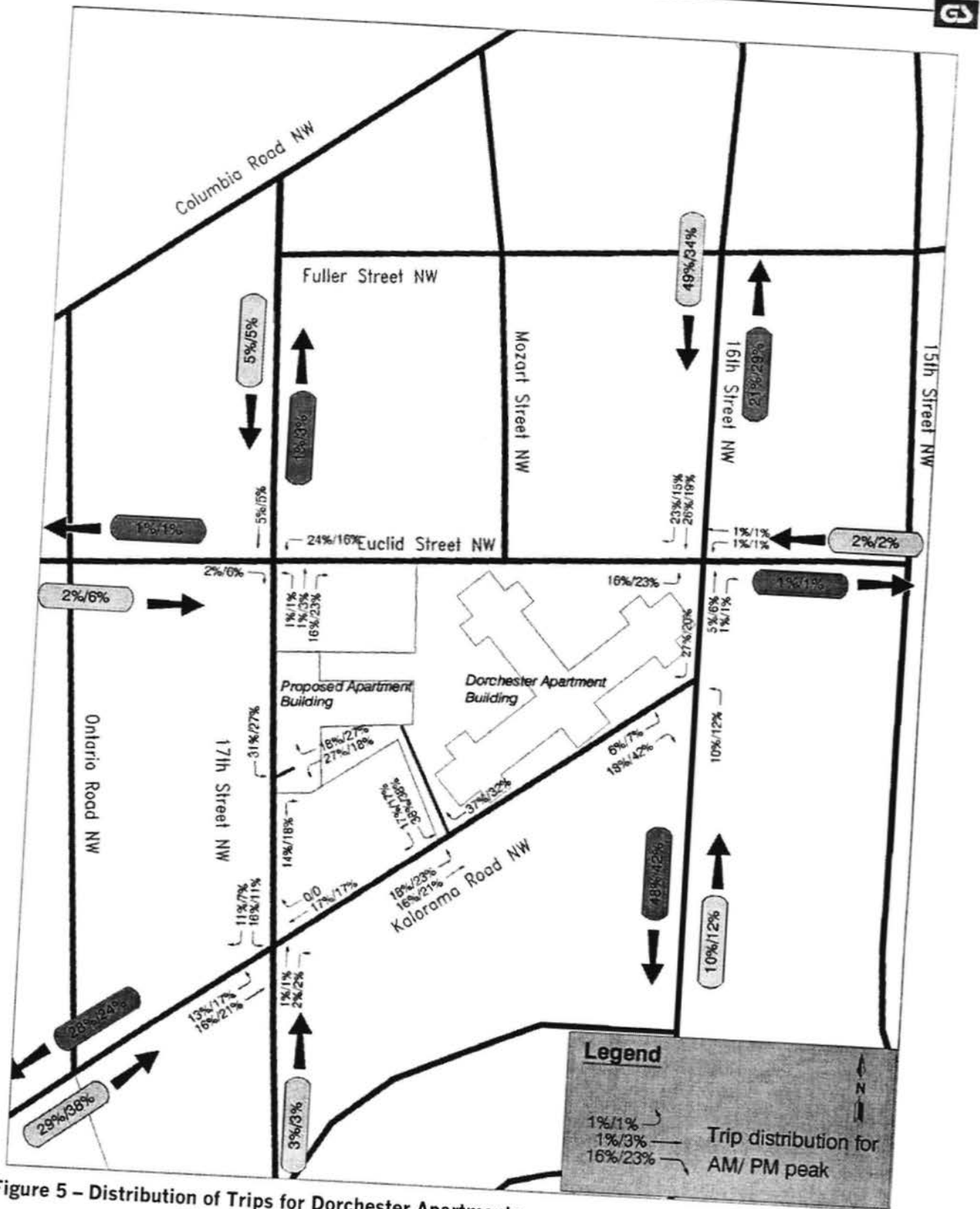


Figure 5 – Distribution of Trips for Dorchester Apartments

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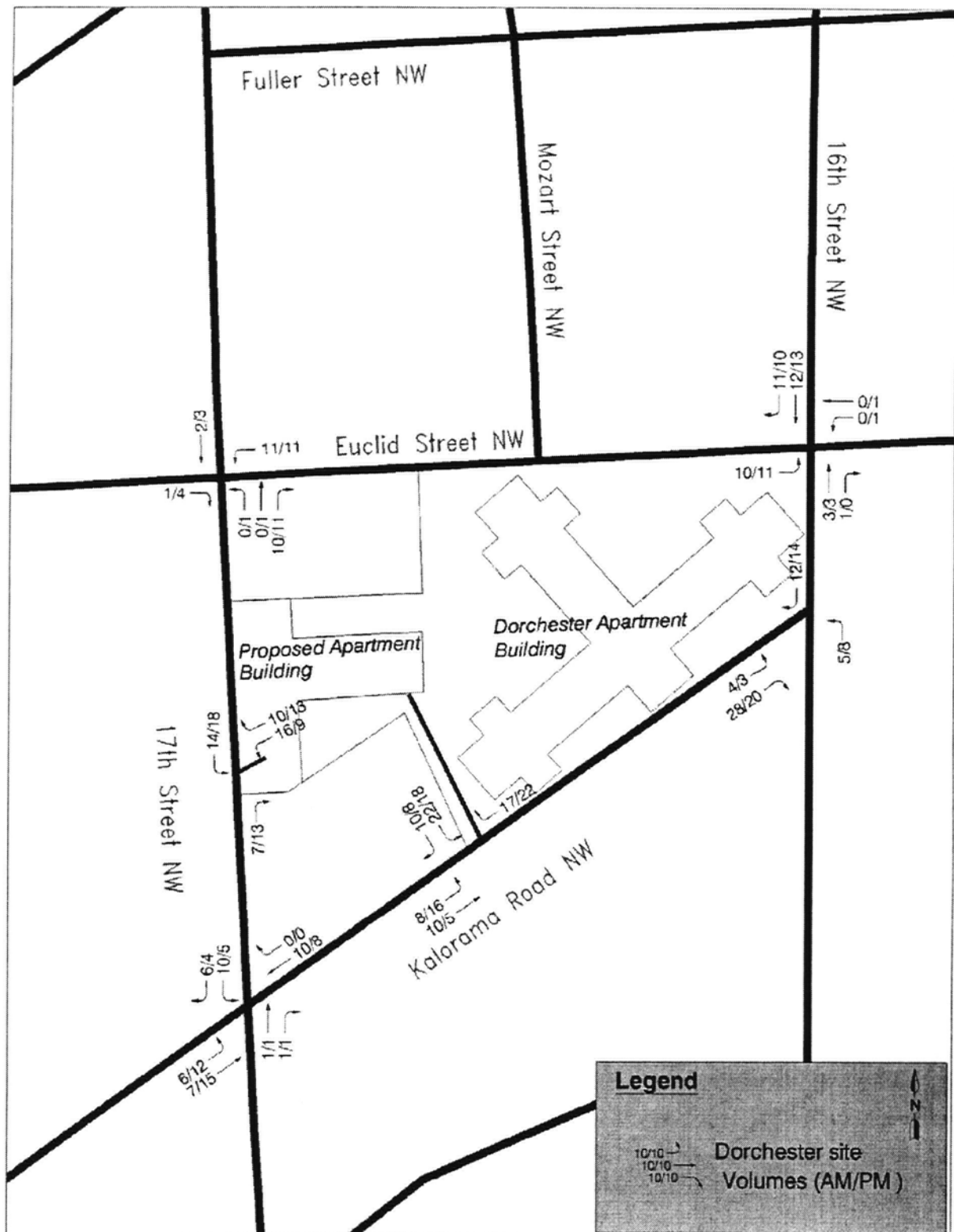


Figure 6 – Peak Hour Traffic Generated by Dorchester Apartments (AM Peak/PM Peak)

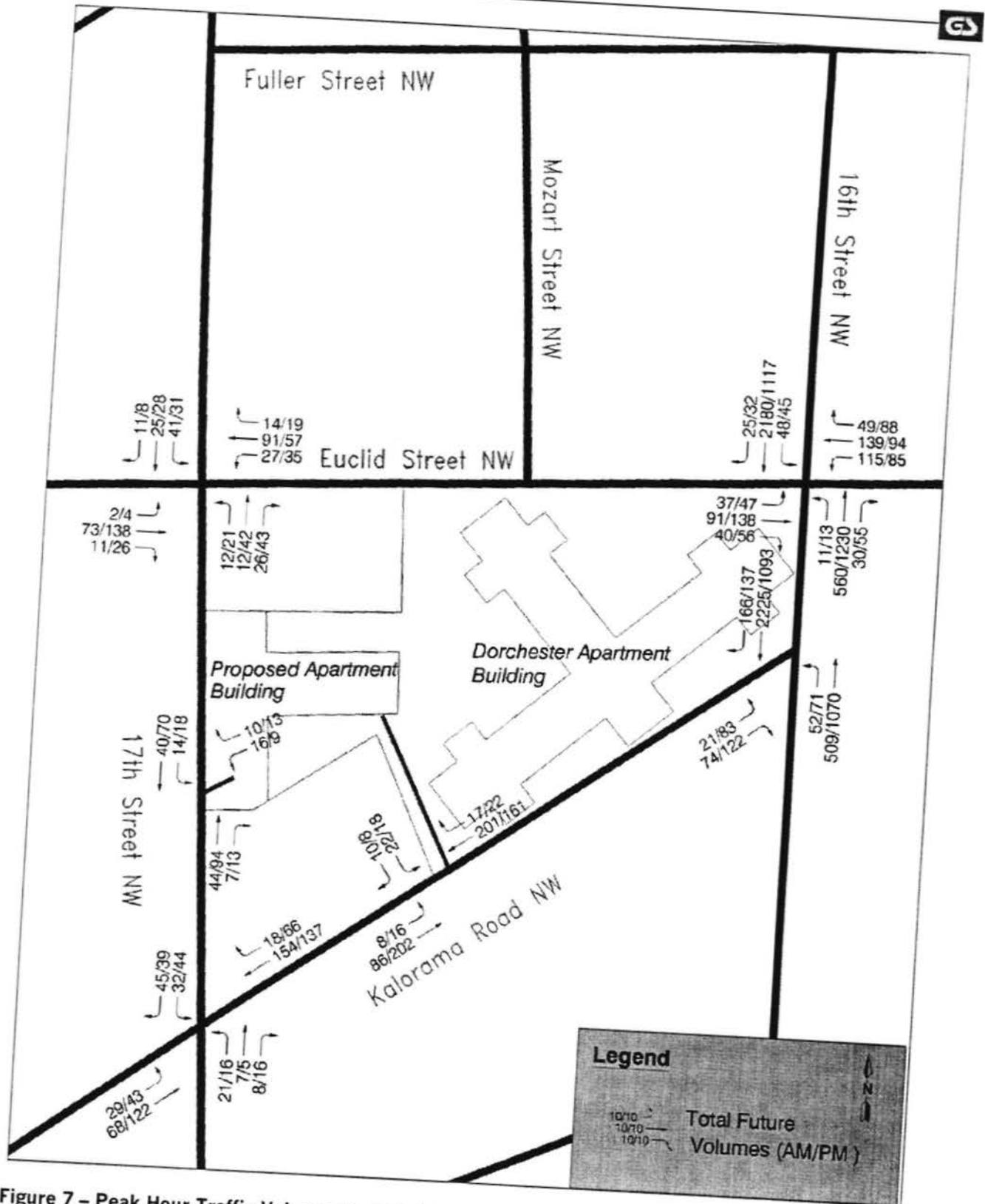


Figure 7 – Peak Hour Traffic Volumes for Total Future Build Conditions (AM Peak/PM Peak)

June 3, 2005

CAPACITY ANALYSIS

G/SA performed a capacity analysis comparing traffic conditions within the study area for the three scenarios studied: (1) existing; (2) future background; and (3) total future conditions. These analyses were performed for all of the study intersections for both the AM and PM peak hours. The Highway Capacity Software 2000 (HCS 4.1e) and methodology contained in the Highway Capacity Manual (HCM) was used for the analysis. The HCM methodology calculates the average delay (in seconds per vehicles) for vehicles passing through an intersection. The average delay is then equated to a letter grade of A through F, called a Level of Service (LOS). DDOT considers a LOS D to be acceptable during peak conditions, although in highly urbanized areas, LOS E can also be acceptable. Table 3 presents the results of the capacity analyses including LOS and average delay results for each intersection and approach. Worksheets containing details of the capacity analyses are included in Appendix C.

The results found in the following table show:

- *Existing (2005) Conditions*

The results of the existing capacity analysis indicate that all of the intersections operate at an acceptable level of service during the AM and PM commuter peak hours with the exception of the eastbound approach of Kalorama and 16th Street during the AM and PM, the eastbound approach of Euclid Street and 16th Street in the PM, and the westbound approach of Euclid and 16th Street during the AM and PM. These approaches operate with very high delay. The signal timing at the intersection of Euclid and 16th Streets could be modified to decrease the delay on the side street approaches. Since 16th Street is a major north-south corridor, the District Department of Transportation has timed the signal to give priority to the traffic on 16th Street. The results of the existing conditions capacity analysis are displayed graphically in Figure 8.

- *Future Background (2008) Conditions*

The results of the future background (2008) capacity analysis indicate that all of the intersections operate at an acceptable level of service D or better during commuter peak hours with the exception of the eastbound approaches of Euclid and Kalorama at their intersections with 16th Street. The intersection approaches to 16th Street that experience excessive delay presently will increase with background traffic growth. Traffic on the eastbound approach to the unsignalized intersection of Kalorama Road and 16th Street will be especially impacted by this background growth. Eastbound Kalorama traffic is expected to experience unacceptable delays. These impacts can be mitigated with a traffic signal at the intersection. The results of the capacity analysis of this intersection with a traffic signal are included in Table 3 and show that a signal will improve the level of service of this intersection to within acceptable levels of D or better. This signal will need to be timed and coordinated with the existing signals at the

intersections of 16th Street with Euclid Street to the north and Crescent Place to the south. Proper timing and coordination so that these signals work together will help maintain the current traffic progression that motorists experience today on this major corridor. The results of the future background capacity analysis are illustrated in Figure 9.

▪ ***Total Future (2008) Conditions***

The results of the total future (2008) capacity analysis indicate that all of the intersections operate at the same levels of service that can be expected in the future background scenario without the Dorchester expansion in the AM and PM peak hours with the exception of the eastbound approach to the intersection of Euclid and 16th Streets. The level of service expected on this approach in the future with the Dorchester expansion is an F in the AM peak hour, compared with a level of service E in the future background condition without the expansion. This reduction in level of service can be mitigated with an adjustment to the signal timing at this intersection. This adjustment will need to be coordinated with other signals along the major north – south corridor of 16th Street. The results also show that if the intersection of Kalorama Road and 16th Street were to remain unsignalized, the already deficient level of service of this intersection with only background development will be in such a state that any additional traffic will greatly increase the delay. The installation of a traffic signal at this intersection is a mitigation measure to accommodate background development traffic within acceptable levels of delay. The analysis shows that this intersection, if signalized, will operate at acceptable levels of service of D or better with the addition of Dorchester expansion traffic. Table 3 shows the capacity analysis results for both the unmitigated and mitigated scenarios as discussed above. The results of the total future capacity analyses with mitigation are shown in Figure 10.

The complete HCS analysis is included as Appendix C.

**Table 3 – Capacity Analysis Results**

Intersection	Movement	EX	FB	TF	EX	FB	TF
		LOS (Delay)			LOS (Delay)		
		AM			PM		
17 th Street and Euclid Street							
Unsignalized	Eastbound Approach	A (7.6)	A (7.7)	A (7.8)	A (8.1)	A (8.4)	A (8.5)
	Westbound Approach	A (7.8)	A (7.9)	A (8.1)	A (7.7)	A (8.0)	A (8.2)
	Northbound Approach	A (7.3)	A (7.5)	A (7.5)	A (7.6)	A (8.0)	A (8.1)
	Southbound Approach	A (7.8)	A (7.9)	A (7.9)	A (7.8)	A (8.1)	A (8.2)
	Overall	A (7.7)	A (7.8)	A (7.9)	A (7.9)	A (8.2)	A (8.3)
17 th Street and Kalorama Road							
Unsignalized	Eastbound Approach	A (7.5)	A (7.9)	A (8.0)	A (7.8)	A (8.4)	A (8.6)
	Westbound Approach	A (7.8)	A (8.2)	A (8.3)	A (7.6)	A (8.4)	A (8.5)
	Northbound Approach	A (7.4)	A (7.7)	A (7.8)	A (7.5)	A (7.8)	A (7.9)
	Southbound Approach	A (7.1)	A (7.5)	A (7.7)	A (7.4)	A (8.1)	A (8.1)
	Overall	A (7.6)	A (7.9)	A (8.0)	A (7.6)	A (8.3)	A (8.4)
16 th Street and Euclid Street							
Signalized	Eastbound Approach	D (45.3)	D (46.4)	D (51.7)	E (63.4)	E (75.5)	F (100.6)
	Westbound Approach	F (196.4)	F (256.2)	F (261.6)	F (160.1)	F (278.8)	F (274.5)
	Northbound Approach	A (6.3)	A (6.4)	A (6.4)	A (9.6)	B (10.4)	B (10.4)
	Southbound Approach	B (13.0)	B (14.2)	B (14.5)	A (7.2)	A (7.6)	A (7.6)
	Overall	C (29.7)	D (36.5)	D (37.4)	C (25.7)	D (38.3)	D (40.0)
Mitigated with signal timing adjustment	Eastbound Approach	--	--	C (30.2)	--	--	C (34.9)
	Westbound Approach	--	--	D (52.6)	--	--	D (46.6)
	Northbound Approach	--	--	B (11.9)	--	--	C (20.2)
	Southbound Approach	--	--	D (41.3)	--	--	B (14.7)
	Overall	--	--	D (36.5)	--	--	C (21.5)
16 th Street and Kalorama Road							
Unsignalized	Eastbound Approach	E (49.7)	F (235.5)	F (233.9)	D (29.1)	F (168.9)	F (172.5)
	Northbound Approach	C (18.2)	D (25.8)	D (26.2)	B (10.4)	B (11.2)	B (11.3)
Mitigated with signal installation	Eastbound Approach	--	D (36.3)	D (37.5)	--	D (49.6)	D (52.3)
	Northbound Approach	--	A (7.6)	A (7.8)	--	B (12.7)	B (13.4)
	Southbound Approach	--	B (13.1)	B (13.1)	--	A (6.8)	A (6.8)
	Overall	--	B (12.7)	B (12.9)	--	B (12.7)	B (13.4)
Kalorama Road and Site's Driveway							
Unsignalized	Eastbound Approach	A (7.5)	A (7.6)	A (7.7)	A (7.4)	A (7.6)	A (7.6)
	Southbound Approach	A (9.5)	B (10.1)	B (10.2)	A (9.4)	B (10.5)	B (10.7)
17 th Street and Site's Driveway							
Unsignalized	Westbound Approach	--	--	A (9.0)	--	--	A (9.2)
	Southbound Approach	--	--	A (7.3)	--	--	A (7.4)

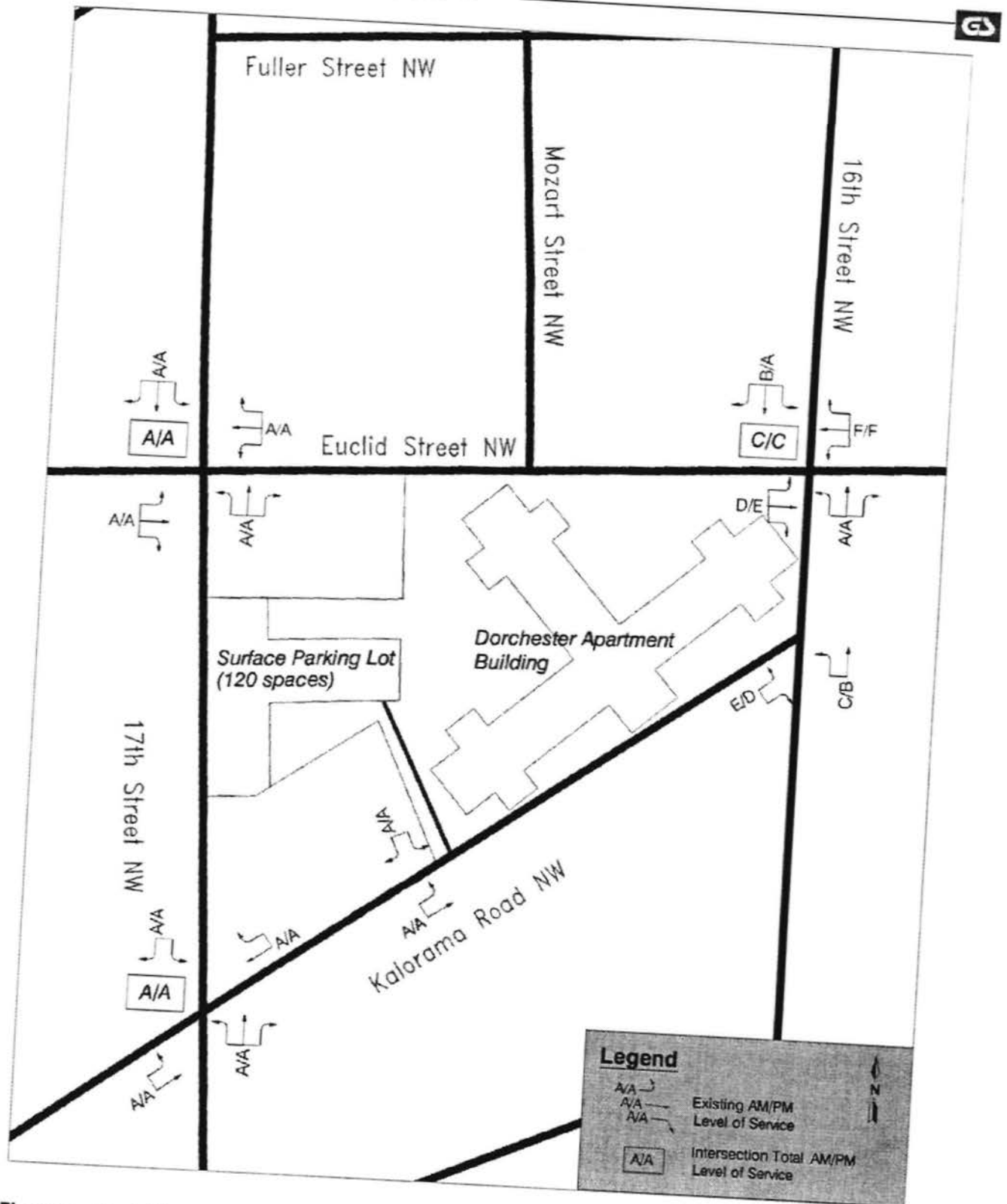


Figure 8 – Peak Hour Level of Service for Existing Conditions (AM Peak/PM Peak)

June 3, 2005

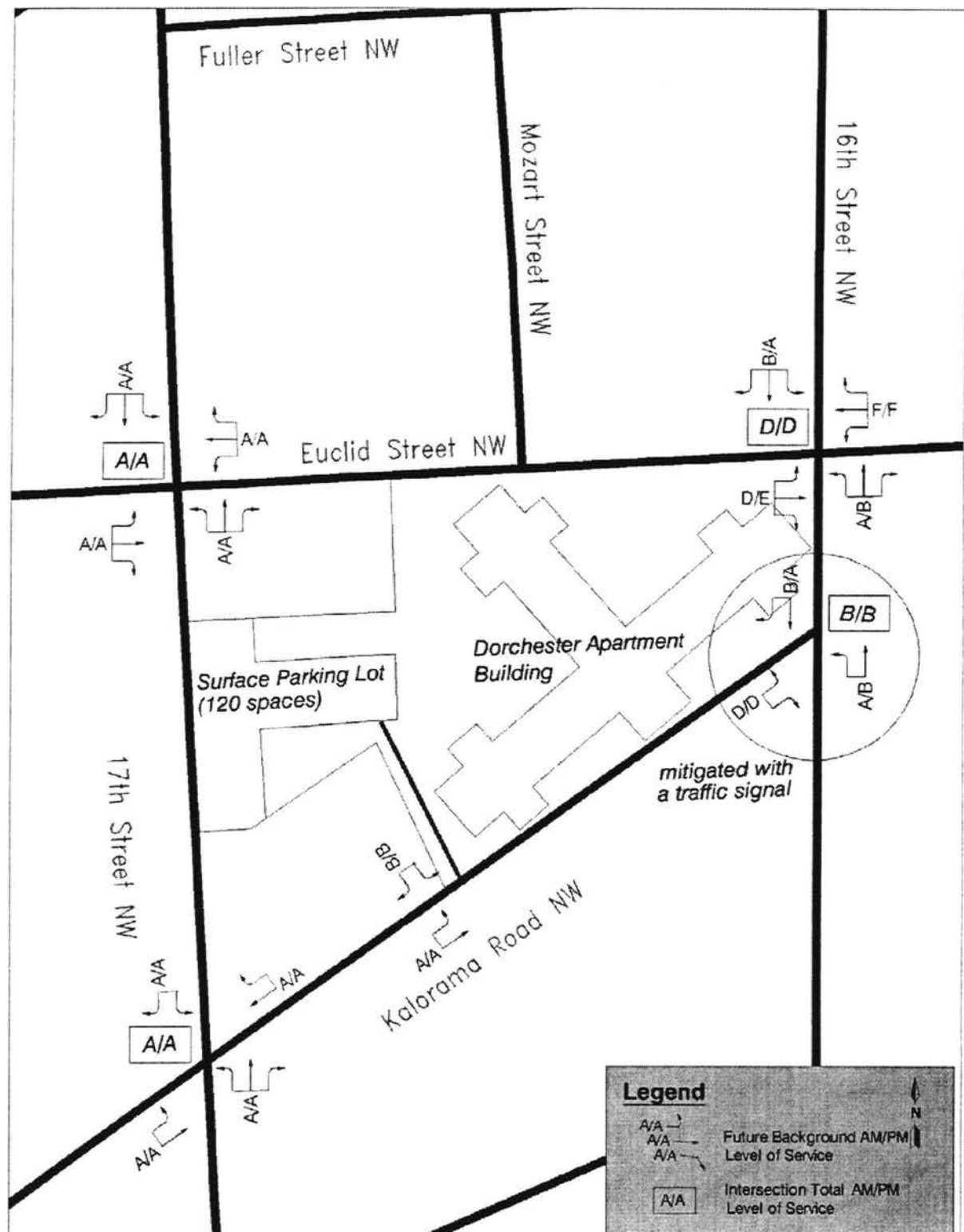


Figure 9 – Peak Hour Level of Service for Future Background Conditions (AM Peak/PM Peak)

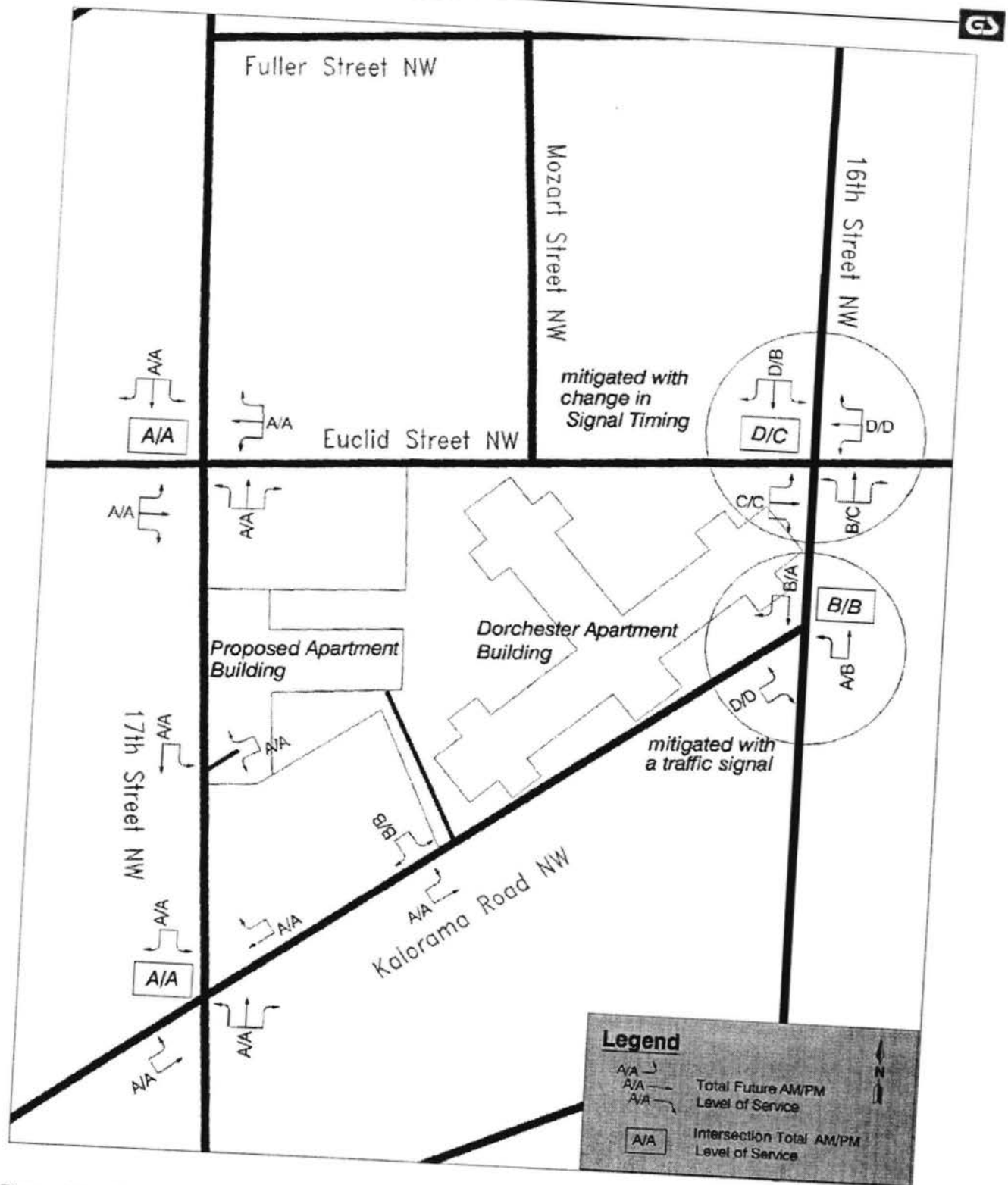


Figure 10 – Peak Hour Level of Service for Total Future Conditions (AM Peak/PM Peak)

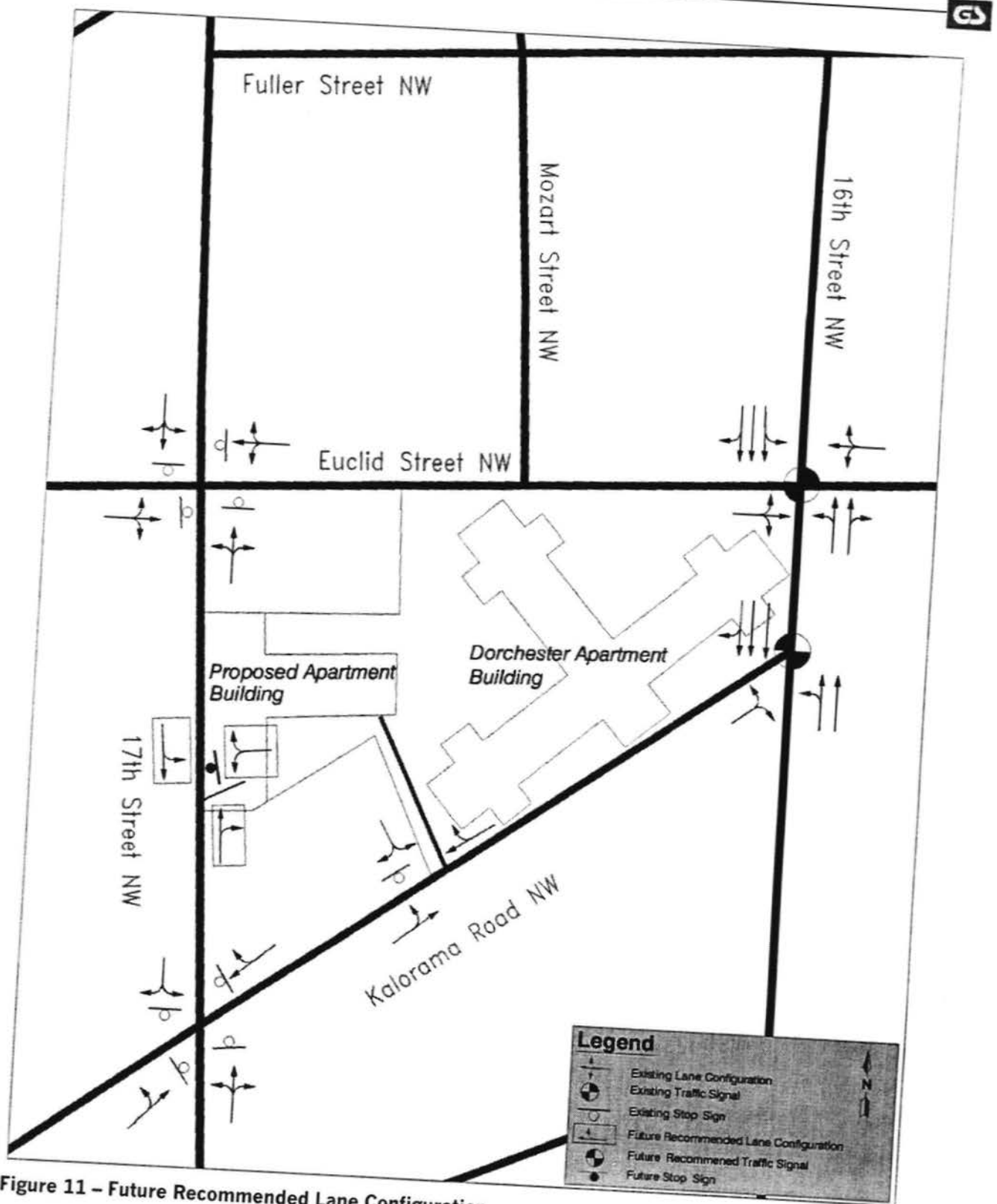


Figure 11 – Future Recommended Lane Configuration

June 3, 2005

PARKING

The Dorchester site currently contains 395 dwelling units and 120 surface parking spaces. Of these 120 spaces, some are reserved, but the majority is unreserved. This allows for the time sharing of spaces – a daytime user occupying a space that would later be occupied by an evening user. Sample daytime users include: property employees; contractors; guests of residents; and commercial users including Children's Hospital employees. With this shared parking arrangement, more vehicles park at the Dorchester site in a 24 hour period than there are parking spaces.

The expansion is to be constructed partially on the existing surface parking lot and will include 140 to 145, or about 143, apartments and a two-level, 307-space parking garage with 8 of the 307 spaces in tandem. The lower level of this garage will be accessed via the existing surface lot access point on Kalorama Road. The upper level will be accessed from a new access point on 17th Street at the southern end of the property frontage on 17th Street. Approximately 40' of curbside parking, or two parking spaces, will need to be removed on the east side of 17th Street in order to establish this access.

The majority of the parking spaces in the garage will be reserved. The projected parking space use is as follows:

- 120 spaces for the existing building
- approximately 143 spaces for the new building
- 14 spaces for commercial users including Children's Hospital
- 2 or 3 short-term rental car spaces (ie., Zipcar)
- 7 to 10 spaces for property employees, contractors, and guests of residents
- The remaining parking spaces could be used as neighborhood residential parking

The existing building's parking needs will be accommodated in the new parking garage as they are today – with 120 parking spaces. The expansion will be accommodated with approximately one space per dwelling unit. Since these spaces will be reserved in the new garage, additional parking will be provided for daytime users who, today, share parking with residents. The remaining parking will be used for property employees, contractors, and guests of residents. The proposed parking supply of 307 spaces is expected to be sufficient for accommodating all of the future users of the expansion. Therefore, the expansion is not expected to exacerbate the current neighborhood on-street parking situation. Once in operation, it may be found that there is a surplus of parking. In that case, the surplus may be offered to local residents or to the tenants of the neighboring Citadel building for their use. This may, in fact, improve the on-street parking situation in this neighborhood.

LOADING DOCK

The Dorchester currently operates a loading dock that is accessed from Kalorama Road and is adjacent to and east of the existing site drive. This dock will operate as it does today to serve the loading and trash collection needs of the residents and the existing grocery store. Therefore, the existing dock was not analyzed in this report. A 45-foot loading dock will be constructed with the expansion. This dock will be accessed from 17th Street and will be located adjacent to and south of the proposed upper level garage entrance.

Residential moving trucks, garbage trucks, and delivery/contractor vans are expected to use the proposed loading dock. The frequency of truck arrivals is one measure that will dictate how well the dock operates and the impact that its operation may have on the neighborhood. On average, approximately 25% of apartments turn over each year. Also, the trash can be expected to be collected about twice per week. Based on these assumptions, an average of 7 trucks per week can be expected associated with the new dock. This frequency of trucks will not have a noticeable impact on traffic operations in the neighborhood.

A second measure of operation is the size of trucks that can be expected and the maneuvering space needed to access the dock. The majority of moving vans, garbage trucks and delivery/contractor vans are expected to be single unit (SU) trucks that are no longer than 30 feet. The AASHTO SU design vehicle, a 30-foot long single unit truck, was used to simulate the maneuvering necessary to access the proposed loading dock from the north and from the south on 17th Street. This analysis is shown in Figures 12 and 13. The analysis found that if the truck arrives from the south as shown in Figure 12, 1 on street parking spaces will need to be removed on the west side of 17th Street in order to provide the space necessary for the truck to access the dock. If the truck arrives from the north as shown in Figure 13, the truck's maneuvering will affect 1 on street parking space as well. This space is in addition to the 2 parking spaces that will be lost on the east side of 17th Street to provide access to the loading dock and upper level of the garage.

Occasionally, larger articulated trucks may be expected to use this loading dock. The size of these trucks is limited by two factors: 1) the geometry of the neighborhood streets and 2) the size of the existing and proposed dwelling units. Preliminary analysis has shown that articulated trucks longer than 45 feet are not able to negotiate turns at the intersections in this neighborhood given that there is typically parking on either side of the street and internal neighborhood streets are 30 feet curb-to-curb. The dwelling units of the Dorchester are 1 and 2 bedroom apartments. It is unlikely that a truck longer than 45 feet will be needed to move the belongings that could fit within a 2-bedroom unit. Therefore, the largest truck that could be expected at the proposed loading dock was determined to most resemble the WB-40 AASHTO design vehicle, a 45-foot long articulated truck. The maneuvering analysis of this truck can be seen in Figures 14 and 15. This analysis showed that if the truck were to arrive from the south as seen in Figure 14, 4 on street parking spaces will need to be removed on the



west side of the street in order to accommodate the truck's maneuvering into and out of the dock. If the truck were to arrive from the north as shown in Figure 15, 1 parking space will be affected.

In all of the above analysis, the two existing parking spaces directly across from the Citadel building loading dock were assumed to have been removed to accommodate truck maneuvering at that loading dock. Also, the affected parking spaces discussed above do not include the 2 parking spaces that will be removed in order to establish the access to the parking garage and loading dock on the east side of 17th Street.

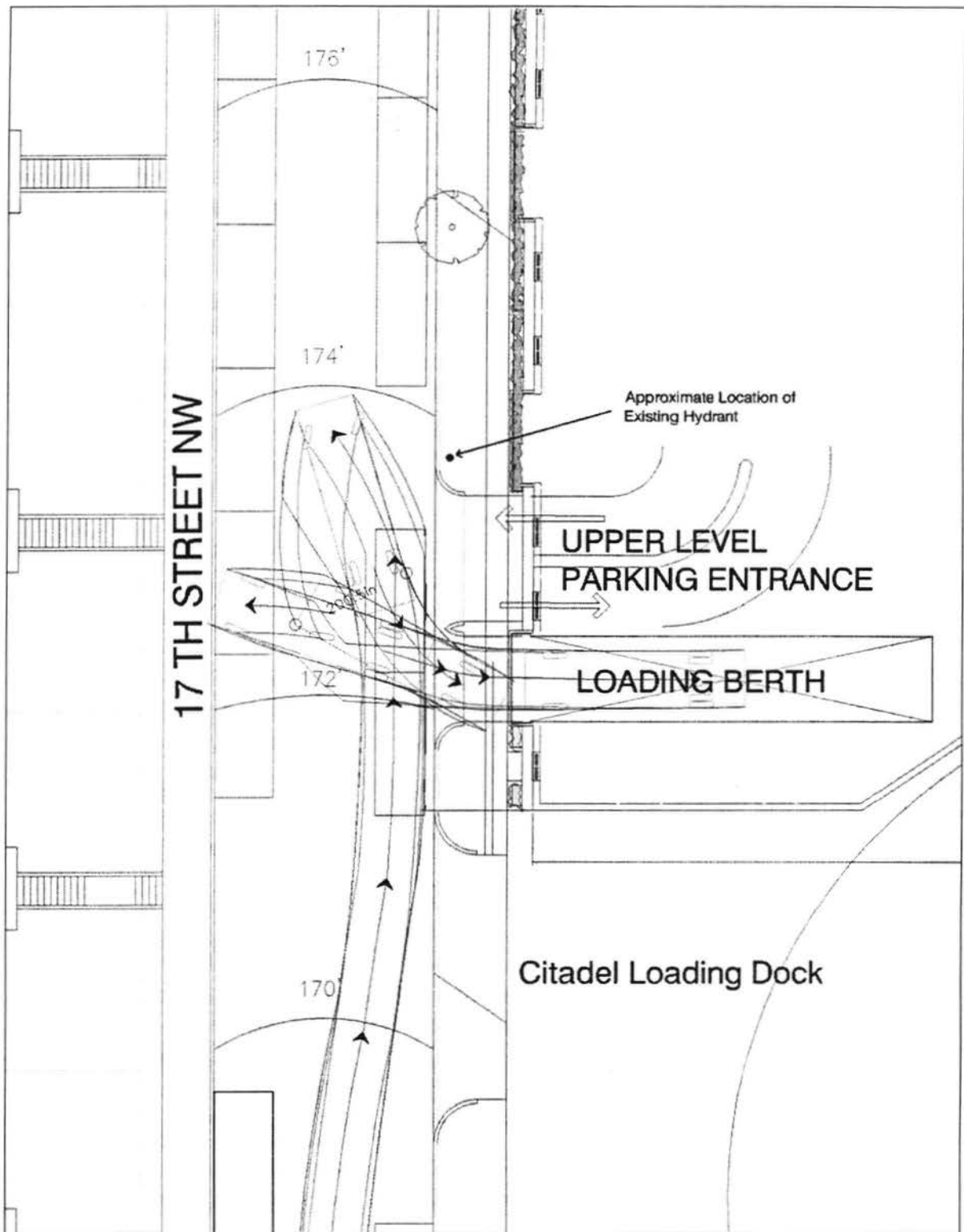


Figure 12 – Northbound Loading Dock Analysis for Single Unit (SU) Trucks

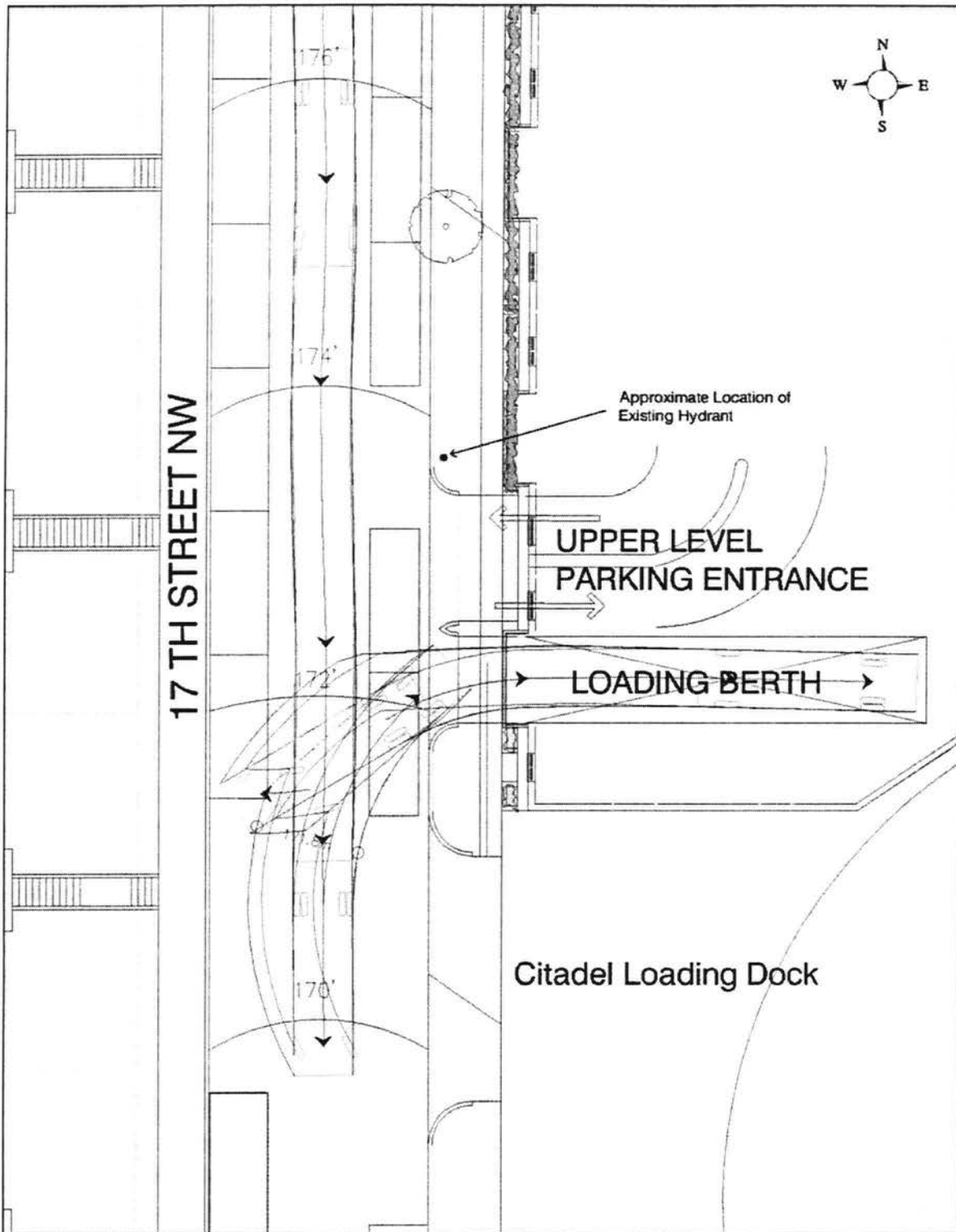


Figure 13 – Southbound Loading Dock Analysis for Single Unit (SU) Trucks

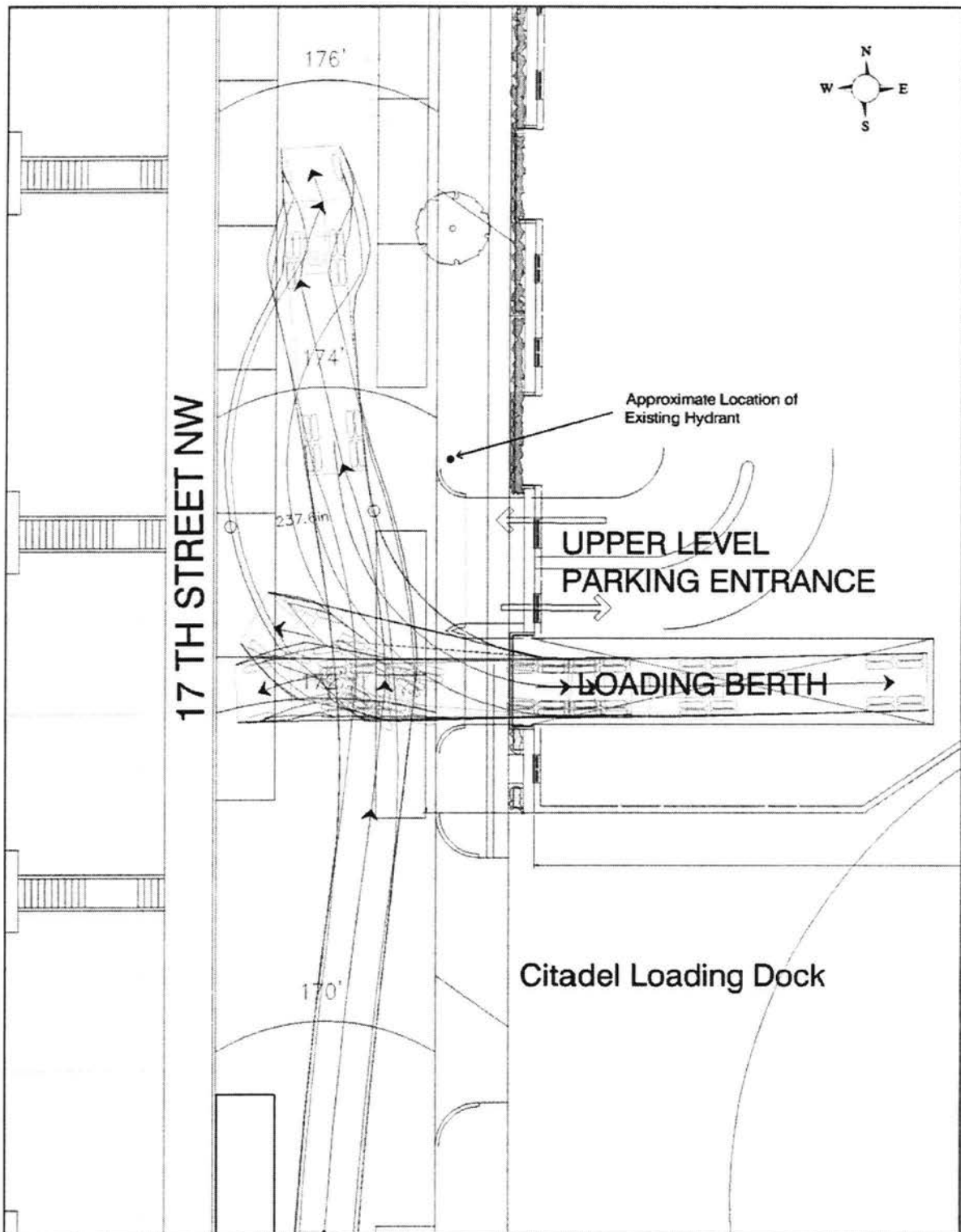


Figure 14 – Northbound Loading Dock Analysis for WB-40 Trucks

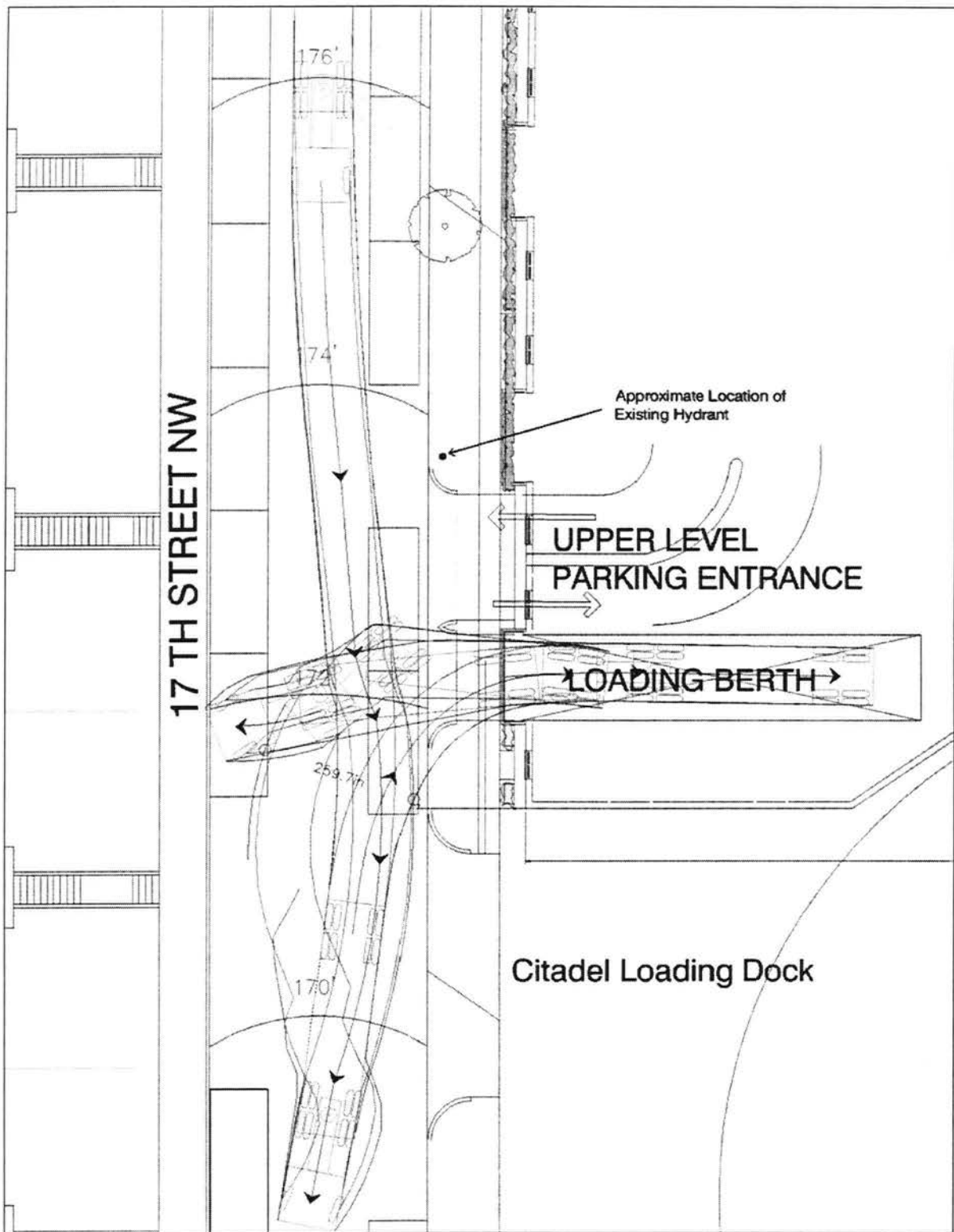


Figure 15 – Southbound Loading Dock Analysis for WB-40 Trucks



CONCLUSION

The analyses presented in this report resulted in the following conclusions:

Existing (2005) Traffic Conditions

- Existing traffic conditions at the study area intersections show mostly acceptable Levels of Service except 16th and Euclid and 16th and Kalorama.
- The existing traffic generated by Dorchester Apartments is relatively small at 41 AM peak hour and 46 PM peak hour trips.

Future Background (late 2007/ early 2008) Conditions

- The intersections in the study area are expected to operate at acceptable levels of service during peak hours with the exception of the side street approaches to the intersections on 16th Street that already experience delays in the existing condition.
- Traffic on the eastbound approach to the unsignalized intersection of Kalorama Road and 16th Street will be especially impacted by this background growth.
- Traffic impacts could be mitigated with a traffic signal at the intersection of Kalorama Road and 16th Street and this signal would need to be timed and coordinated with existing signals at nearby intersections of 16th Street with Euclid Street and Crescent Place.

Build Year (late 2007/ early 2008) Conditions

- The expanded Dorchester Apartments will generate approximately 63 and 71 new vehicle trips in the AM and PM peak hours, respectively for a total of 104 AM and 117 PM trips.
- The capacity analysis shows that two of the four study intersections will continue to operate at LOS D or better. The additional trips generated by the expansion of Dorchester Apartments will noticeably affect the operations of the two study intersections: 16th and Euclid Streets and 16th Street and Kalorama Road.
- The traffic impact on the eastbound approach to the intersection of Euclid and 16th Streets could be mitigated with a change in this intersection's signal timing.
- With signal mitigation at the intersection of Kalorama and 16th street, the addition of Dorchester traffic does not degrade the level of service at this intersection below an acceptable level.



Parking

- The parking garage will sufficiently accommodate all vehicles currently parking in the 120-space surface lot, as well as one vehicle for each of the 143 new apartments.

Loading Dock

- A proposed loading dock accessible from 17th Street can accommodate trucks up to 45 feet in length. The impact on street parking depends on the size of truck and its direction of approach.



APPENDIX