

**TRAFFIC IMPACT STUDY
FOR THE TILDEN STREET PUD
WASHINGTON, D.C.**

**Submitted on behalf of:
Clark Realty Capital**

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Section I INTRODUCTION

Overview

At the time this study was undertaken, Clark Realty Capital was proposing to construct a residential community consisting of 60 condominiums on a 35,000 square-foot tract of land designated as Lot 800 of Square 2234 in Northwest Washington, DC. This study is based on analyses performed for the 60 condominium community. However, the latest site plan proposes that 53 dwelling units be constructed on Square 2234 (i.e. seven fewer dwelling units than originally planned). The analysis contained here within was not modified to reflect the slightly lower number of dwelling units but is considered to be a more conservative analysis since fewer dwelling units are now proposed. Square 2234 is bounded by Tilden Street to the north and Connecticut Avenue to the west. The Site Location Map is shown on Figure I-1.

The subject site is currently undeveloped and zoned R-2, under which 8 townhouses would be permitted. Clark Realty Capital is proposing to rezone the subject site to R-5-D to allow for the 60 condominium unit development. The proposed site plan for the development is shown on Figure I-2.

Study Area

The study area was selected based on those intersections that could potentially be affected by the proposed development. Based on a scoping letter approved by District Department of Transportation (DDOT) staff (see Appendix A), the following intersections were selected for detailed analysis:

1. Connecticut Avenue and Tilden Street
2. Tilden Street and Site Access

This report presents an analysis of existing transportation conditions in the site vicinity, an analysis of 2007 no-build conditions, and an analysis of 2007 conditions after the proposed development is completed.

Tasks undertaken in this study included the following:

1. Review of development plans prepared by SORG Architects.
2. Agreement with DDOT staff regarding the traffic study scope.
3. A field reconnaissance of existing roadway and intersection geometrics, traffic controls, and speed limits.
4. Turning movement counts at the study intersections during the AM and PM peak periods.
5. Analysis of existing and projected levels of service at the study intersections.
6. Estimation of the number of AM and PM peak hour trips that would be generated by the proposed project.
7. Recommendation of improvements required to mitigate the impact of the proposed development, if necessary.

Conclusions and Recommendations

The conclusions and recommendations of this study are as follows:

1. Currently, the Connecticut Avenue/Tilden Street intersection operates at a failing level of service during the AM and PM peak hours. During the AM peak hour, all approaches except the southbound approach operate unacceptably. During the PM peak hour, the eastbound and westbound approaches fail.
2. Under background conditions, levels of service at the Connecticut Avenue/Tilden Street intersection are expected to remain relatively unchanged from existing conditions. During the AM peak hour, the eastbound approach will drop from a deficient LOS E to a failing level of service. During the PM peak hour, the southbound approach will drop from a LOS B to a LOS C.
3. The proposed residential development is anticipated to generate 22 AM peak hour vehicular-trips, 26 PM peak hour vehicular-trips and 178 daily vehicular-trips.
4. The proposed development would account for less than one percent of the total 2007 AM and PM peak hour traffic volumes at the Connecticut Avenue/Tilden Street intersection.
5. According to the District of Columbia Municipal Regulations, 20 on-site parking spaces would be required for the 60 condominiums. At least 90 on-site parking spaces are proposed for the development.
6. Under total future conditions, levels of service at the Connecticut Avenue/Tilden Street intersection will remain unchanged from the future background conditions without the proposed development. Certain approaches are projected to operate with an insignificant increase in delay.
7. Compared to the future background conditions without the development, queues under the total future with development conditions are expected to slightly increase for the eastbound approach and westbound left/through lane group. These increases are expected to be ten feet or less for any given movement and, therefore, are considered negligible.
8. The proposed site access will operate acceptably under stop control for the northbound driveway approach. No turn lanes are required on Tilden Street at the site access.

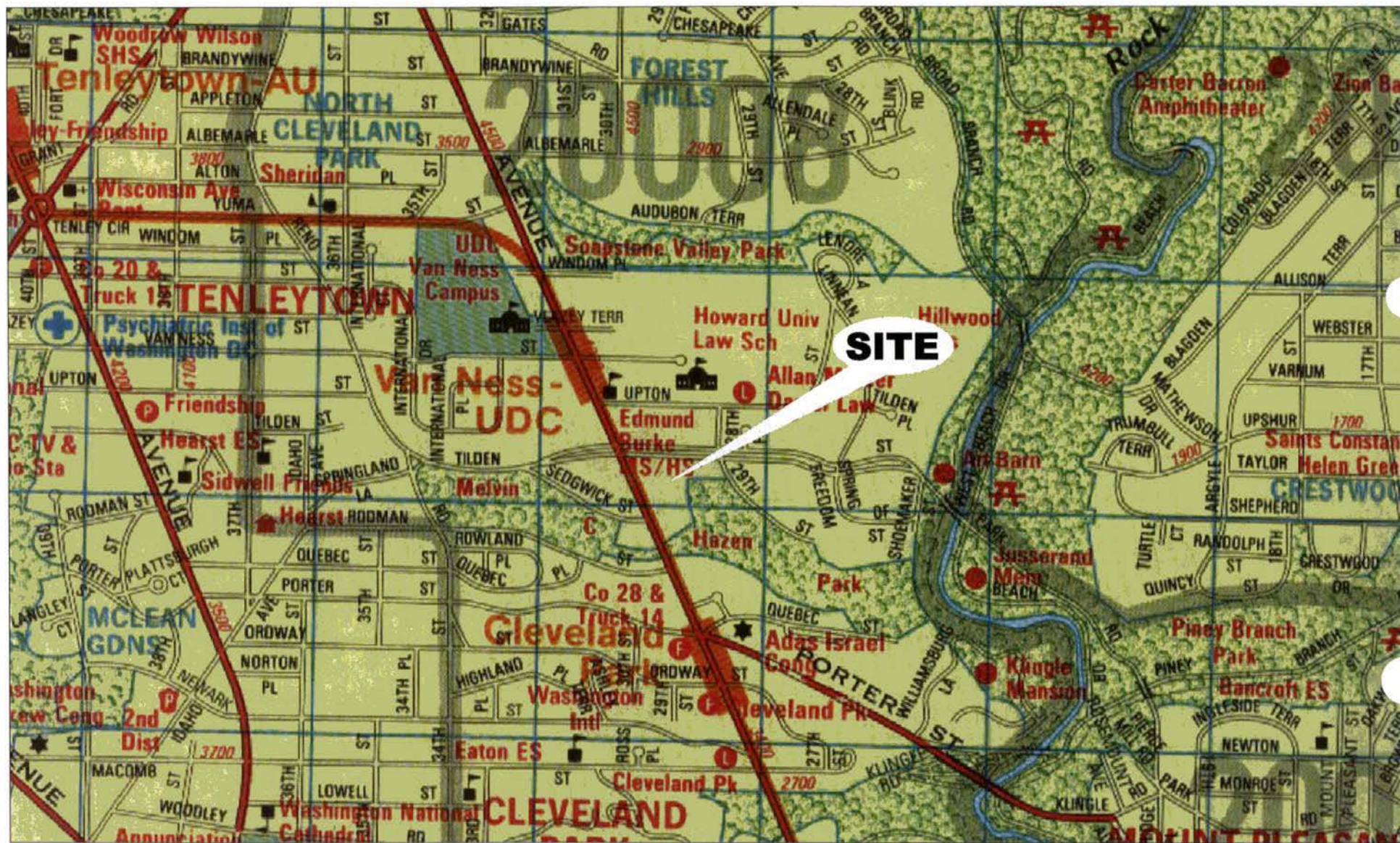


Figure 1-1
Site Location Map

LOT 808 of square 2234 - TILDEN STREET, NW
Washington, DC



Figure 1-2
 Site Plan

Section 2 EXISTING CONDITIONS

Land Use

Currently the subject site is undeveloped. The area surrounding the site is mainly residential with retail uses along Connecticut Avenue. The Honduras Embassy, Kuwait Embassy and Indonesian Residence are located on Tilden Street to the east of the site. The Edmund Burke School is located to the north of the site on Upton Street between Connecticut Avenue and 29th Street. The Melvin C. Hazen Park is located south of the site and to the west across Connecticut Avenue.

Roadway Network

Connecticut Avenue. Connecticut Avenue is a two-way principal arterial¹ that provides a major northwest-southeast connection in the City. Six travel lanes are present along Connecticut Avenue including two reversible center lanes. Connecticut Avenue operates with four southbound and two northbound lanes during weekdays from 7:00 AM to 9:30 AM and four northbound and two southbound lanes during weekdays from 4:00 PM to 6:30 PM. No parking is permitted on Connecticut Avenue during AM and PM reversible lane operation. During off-peak and weekends, Connecticut Avenue operates as two-lanes in each direction with parking on both sides of the road. The posted speed limit on Connecticut Avenue within the site vicinity is 30 miles per hour. Connecticut Avenue has an average annual daily traffic (AADT) volume ranging from 38,000 to 39,000 vehicles per day in the vicinity of the site².

Tilden Street. Tilden Street is a two-way, two-lane, minor arterial³ running east-west through the study area. Two-hour parking from 7:00 AM to 8:30 PM (except for Zone 3 permits) is permitted on both sides of Tilden Street within the vicinity of the site. Tilden Street has a landscaped center median and both sides of the road have sidewalks, which are generally six feet wide. The posted speed limit is 25-mph in the study area. West of Connecticut Avenue, Tilden Street carries an AADT volume of 5,700 vehicles per day while to the east of Connecticut Avenue, the AADT is 10,300 vehicles per day⁴.

The existing lane use and traffic control for each study intersection is shown on Figure 2-1.

Public Transportation Facilities and Services

The Van Ness UDC Metro Station and the Cleveland Park Metro Station are both within walking distance of the proposed condominium community. Specifically, the Van Ness-UDC Metro Station of the Metro Red Line is located on Connecticut Avenue at Veazey Street and is approximately 0.4 miles from the subject site. The Cleveland Park Metro Station, also of the Metro Red Line, is located on Connecticut Avenue at Ordway Street and is approximately 0.5 miles from the subject site. Each Metro station can be accessed from either side of Connecticut Avenue. The U-shaped Red Line extends from Shady Grove in Montgomery County, Maryland, through the District of Columbia, to the Glenmont Station in Montgomery County.

Metrobus service is also provided on Connecticut Avenue by the H2, L1, L2, L4, and N8 Metrobus lines. Bus stops are located on the east and west sides of Connecticut Avenue. More specifically, there are bus stops on Connecticut Avenue at Veazey Street, Van Ness Street, Tilden Street and Sedgwick Street.

Route L1, L2 and L4 operate on Connecticut Avenue and are the major bus routes for traveling north-south through the study area. Route N8 operates from the Van Ness-UDC station outbound along Veazey Street from Reno Road to Wisconsin Avenue and then inbound along Van Ness Street. Route H2 runs along Connecticut Avenue in the study area; however, it serves as far east as the Brookland-CUA Metro Station.

Pedestrian/Bicycle Routes

The signalized intersection of Connecticut Avenue and Tilden Street includes painted crosswalks and pedestrian signals that allow safe crossing maneuvers.

Sidewalks are present along both sides of Tilden Street and Connecticut Avenue.

Traffic Volumes

Turning movement counts were conducted at the Connecticut Avenue/Tilden Street intersection on Wednesday, September 29, 2004 from 6:30 AM to 9:30 AM and from 4:00 PM to 7:00 PM.

Peak hour traffic volumes are summarized on Figure 2-2. Traffic count data are included in Appendix B.

Operational Analysis

Capacity/level of service (LOS) analyses were conducted at the Connecticut Avenue/Tilden Street intersection based on the existing lane use and traffic control shown on Figure 2-1, existing vehicular traffic volumes shown on Figure 2-2, and existing traffic signal timings. Highway Capacity Software (HCS) Version 4.1e, which is based on the Highway Capacity Manual⁵, was used to evaluate levels of service at the study intersections during the AM and PM peak hours. The results are presented in Appendix C and summarized in Table 2-1. Level of service descriptions are summarized in Appendix C.

As shown in Table 2-1, during both peak hours, the Connecticut Avenue/Tilden Street intersection is operating above capacity. During the AM peak hour, the westbound and northbound approaches operate at failing levels of service and the eastbound approach operates at a deficient LOS E. During the AM peak hour, the southbound approach, which is operating at a LOS B, is the only approach operating at acceptable levels of service. During the PM peak hour, the eastbound and westbound approaches operate at failing levels of service while both the northbound and southbound operate at LOS B.

Table 2-1
Existing Levels of Service

APPROACH	AM PEAK	PM PEAK
Connecticut Avenue/Tilden Street		
EB	E (55.4)	F (134.5)
WB	F (512.4)	F (503.9)
NB	F (201.6)	B (16.4)
SB	B (13.4)	B (19.7)
OVERALL	F (110.6)	F (87.9)
(22.2) = Control delay at signalized intersections (sec/veh)		

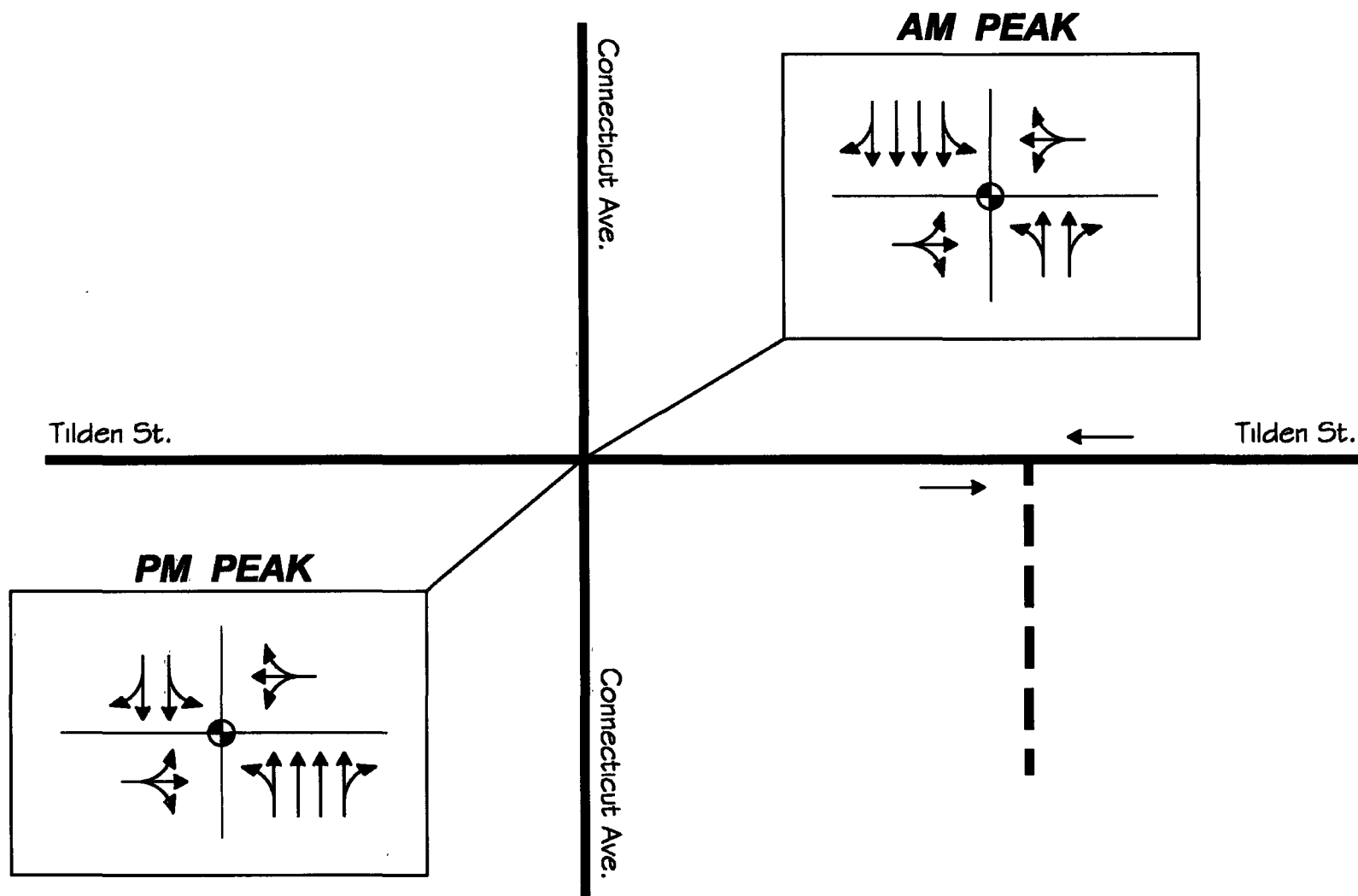


Figure 2-1
Existing Lane Use and Traffic Control

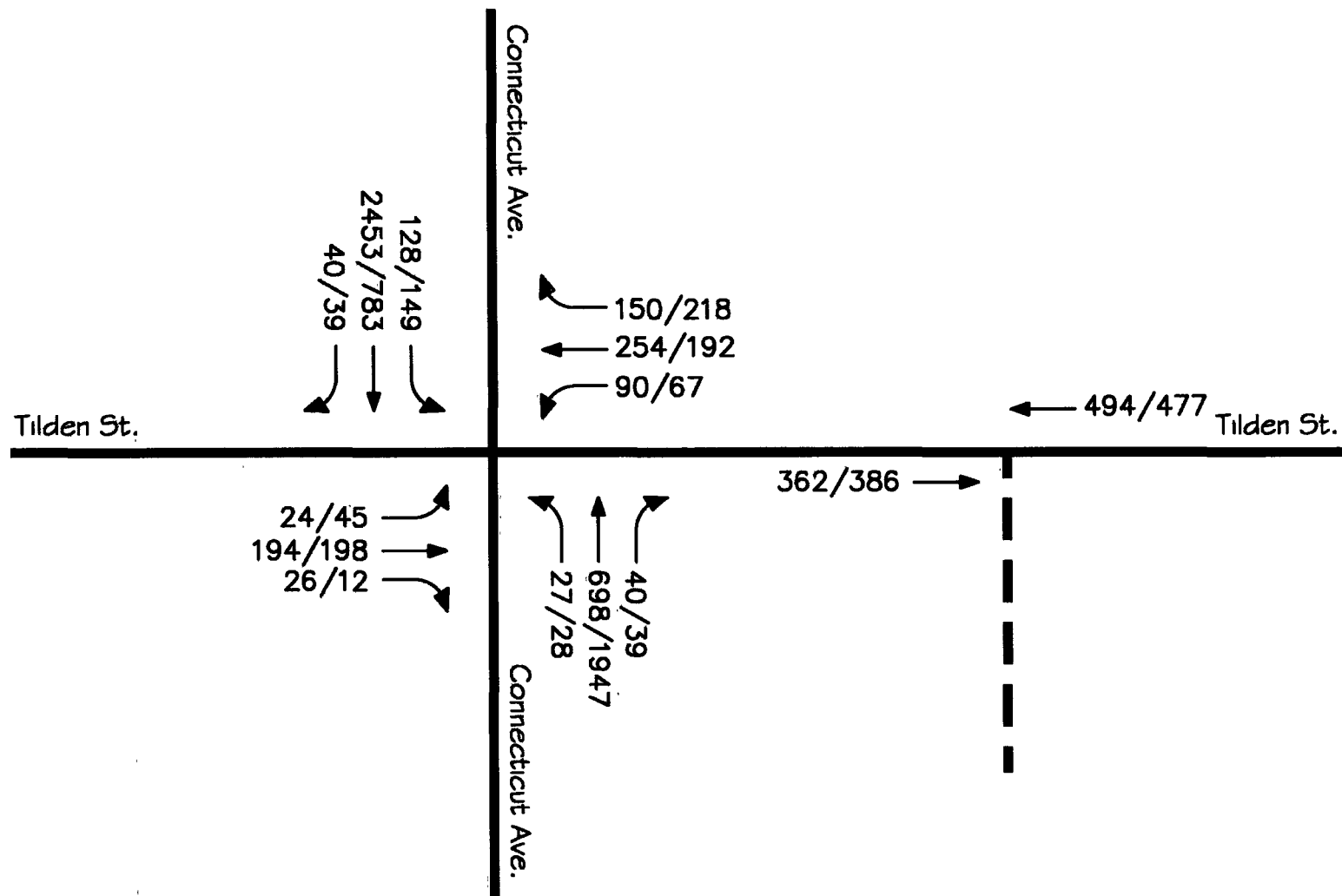


Figure 2-2
Existing Peak Hour Traffic Volumes

AM PEAK HOUR
PM PEAK HOUR
000/000

North
Schematic

Section 3 FUTURE BACKGROUND CONDITIONS

Land Use

The Sheridan School and the Edmund Burke School, which are both located within the general site vicinity, are both planning to increase their enrollment caps. However, there are no other planned developments within the immediate vicinity of the site.

Roadway Network

According to the Connecticut Avenue Transportation Study⁶ performed by DMJM+HARRIS, Inc. for DDOT, it is recommended that westbound parking on Tilden Street be eliminated to allow for construction of a right-turn lane. The addition of a westbound overlap phase for the right-turn movement is also recommended. The Study suggests this improvement to be made as a short-term improvement and, therefore, the 2007 future conditions analyses contained here within include the westbound right-turn lane with overlap phasing.

The Study also recommends that a 100-foot westbound left-turn lane on Tilden Street be constructed by removing a portion of the median. This improvement is recommended as a long-term improvement and since the Study's future conditions were for the year 2012, this improvement was not assumed for the 2007 future conditions analyses contained here within.

Traffic Volumes

Future traffic volumes for the area were calculated using a one percent per year, compounded growth rate, which was agreed upon in the scoping letter (see Appendix A) and is consistent with other studies conducted in this area. This growth factor accounts for regional traffic growth outside the immediate site vicinity.

Additionally, two proposed developments in the general area were considered when determining the anticipated traffic volumes for the 2007 background conditions. The Sheridan School, which is located at 400 36th Street, is proposing to increase its enrollment cap from 215 students to 226 students. According to The Sheridan School Transportation Study conducted by Wells & Associates,⁷ the five percent increase in the enrollment cap would not constitute a significant increase in trip generation by the school. Specifically, the study states:

"Two hundred twenty six (226) students, and a commensurate increase in faculty/staff, would add only 34 school AM peak hour vehicle-trips, and 33 school PM peak hour vehicle-trips. These increases are inconsequential. These additional trips would not significantly affect existing peak hour levels of service."

Therefore, additional traffic from the proposed enrollment cap increase at The Sheridan School was not explicitly included in the future background forecasts for this study.

Similarly, the Edmund Burke School, located at 2955 Upton Street (between Connecticut Avenue and 29th Street), is proposing to increase enrollment from 295 students to 320 students and increase faculty from 55 to 70. The Edmund Burke School Transportation Management Plan performed by Wells & Associates⁸ indicates the following:

"Increasing enrollment from 295 to 320 students would add only 11 to 14 vehicle-trips during the school peak hours and only six to seven vehicle-trips during the street peak hours. This small increase in traffic can be adequately accommodated by the proposed physical and traffic management plans."

Therefore, the Edmund Burke School study did not account for additional site trips generated by the proposed enrollment cap increase. However, the transportation management plan proposed in the study would result in the rerouting of existing school traffic. This rerouting does have an effect on the Connecticut Avenue/Tilden Street intersection as shown on Figure 3-1. The volumes shown on Figure 3-1 were derive from two figures included in the "Edmund Burke School Transportation Management Plan" and have been included in Appendix D.

To obtain the future background peak hour traffic forecasts, which are shown on Figure 3-2, the rerouted Edmund Burke School traffic was added to the factored traffic volumes.

LOS E under existing conditions to a failing level of service under the future background conditions. During the PM peak hour, the southbound approach drops from a LOS B under existing conditions to a LOS C under the future background conditions.

HCS worksheets are included in Appendix E.

Operational Analysis

Capacity analyses were performed for the study intersections using the lane use and traffic control shown on Figure 2-1 with the addition of a westbound right-turn lane, the 2007 background traffic forecasts shown on Figure 3-2 and existing signal timings plus the westbound right-turn overlap. The results of the analyses are summarized in Table 3-1.

Table 3-1
Future Background Levels of Service

APPROACH	AM PEAK	PM PEAK
Connecticut Avenue/Tilden Street		
EB	F (688.2)	F (780.0)
WB	F (120.7)	F (82.8)
NB	F (242.0)	B (16.8)
SB	B (13.9)	C (20.9)
OVERALL	F (111.7)	F (81.1)
(22.2) = Control delay at signalized intersections (sec/veh)		

As shown in Table 3-1, under 2007 conditions without the proposed residential development, levels of service at the Connecticut Avenue/Tilden Street intersection are projected to remain nearly unchanged from existing conditions. During the AM peak hour, the eastbound approach drops from a

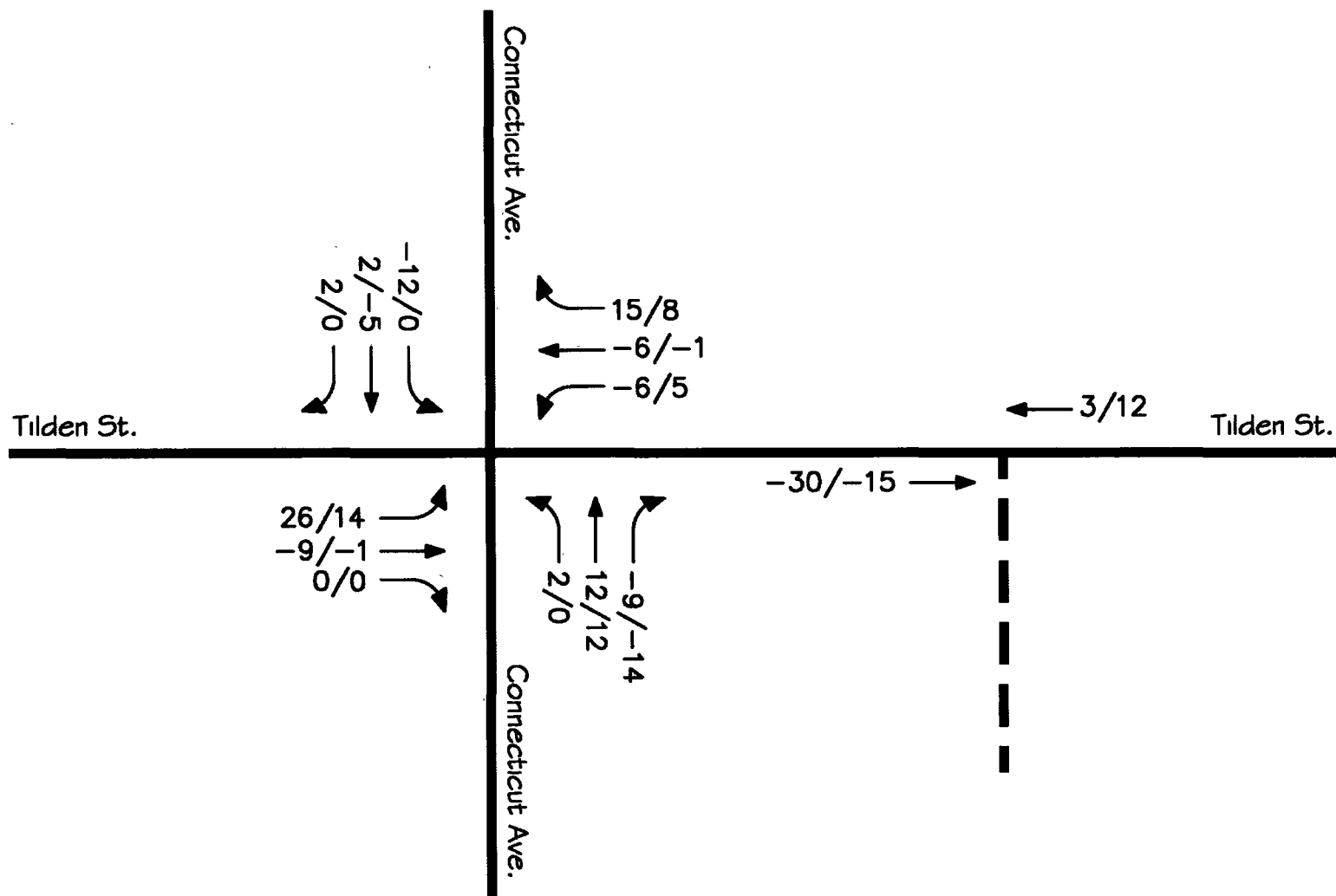


Figure 3-1
Edmund Burke School Rerouted Peak Hour Traffic Volumes

ALL VOLUMES
IN THOUSANDS
000/000

North
Schematic

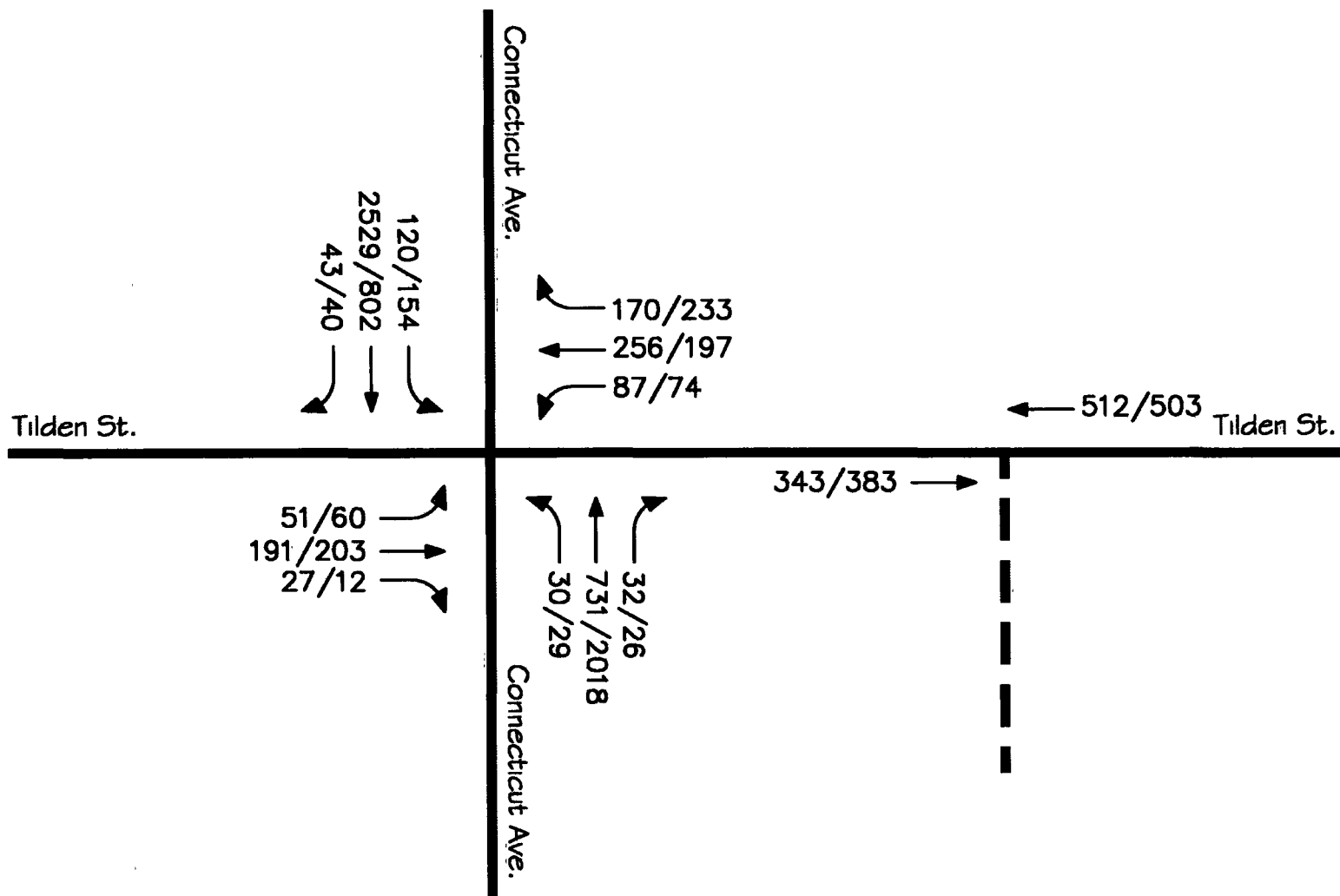


Figure 3-2
Future Background Peak Hour Traffic Forecasts

AM Peak Hour
PM Peak Hour
000/000



Section 4 SITE ANALYSIS

Trip Generation Analysis

The number of trips anticipated to be generated by the proposed condominium community was estimated based on the Institute of Transportation Engineers' (ITE) Trip Generation⁹. Land Use Code 230, Residential Condominium/Townhouse, was used with the number of units as the independent variable.

The condominium community is projected to generate an estimated 34 AM peak hour trips, 40 PM peak hour trips, and 269 daily trips. As previously stated Van Ness UDC Metro Station and Cleveland Park Metro Station are both located within close proximity to the subject site. Based on the walking distance from the proposed condominium community to the closest metro station (Van Ness), a portion of the generated trips were assumed to utilize public transit. Specifically, an estimated 34 percent of the trips generated by the proposed development would be non-auto trips¹⁰. Therefore, the Tilden Street condominium community would generate an estimated 22 AM peak hour vehicle-trips, 26 PM peak hour vehicle-trips and 178 daily vehicle-trips.

The trip generation is summarized in Table 4-1.

Table 4-1
Trip Generation Summary

	AM Peak			PM Peak			A D T
	In	Out	Total	In	Out	Total	
Total Trips	6	28	34	27	13	40	269
Transit Reduction	-2	-10	-12	-9	-5	-14	91
Net Vehicle Trips	4	18	22	18	8	26	178

Trip Distribution

The distribution of peak hour trips generated by the proposed development was based on existing traffic patterns in the study area and the premise that commuters will select routes that minimize travel time.

An estimated 42 percent of the site generated traffic would approach/depart the site to/from the north via Connecticut Avenue, while approximately 40 percent would approach/depart the site to/from the south via Connecticut Avenue.

Approximately seven percent of site-generated traffic would approach/depart the site to/from the west via Tilden Street, while an estimated 11 percent would approach/depart the site to/from the east on Tilden Street.

Proposed Roadway Network

Access to the 60 condominiums is proposed via a stop-controlled, full-access driveway on Tilden Street approximately 1000 feet east of the Connecticut Avenue/Tilden Street intersection.

Site Traffic Assignments

The site-generated traffic volumes were assigned to the public roadway network according to the directional distribution and the location of the site access described above. The resulting site traffic assignments are shown on Figure 4-1.

Parking Requirements

According to the District of Columbia Municipal Regulations (DCMR),¹¹ one parking space for every three dwelling unit is required in the R-5-D zoning district. The latest site plan for the proposed development shows in excess of 90 parking spaces and, therefore, exceeds the minimum parking ratios required by DCMR.

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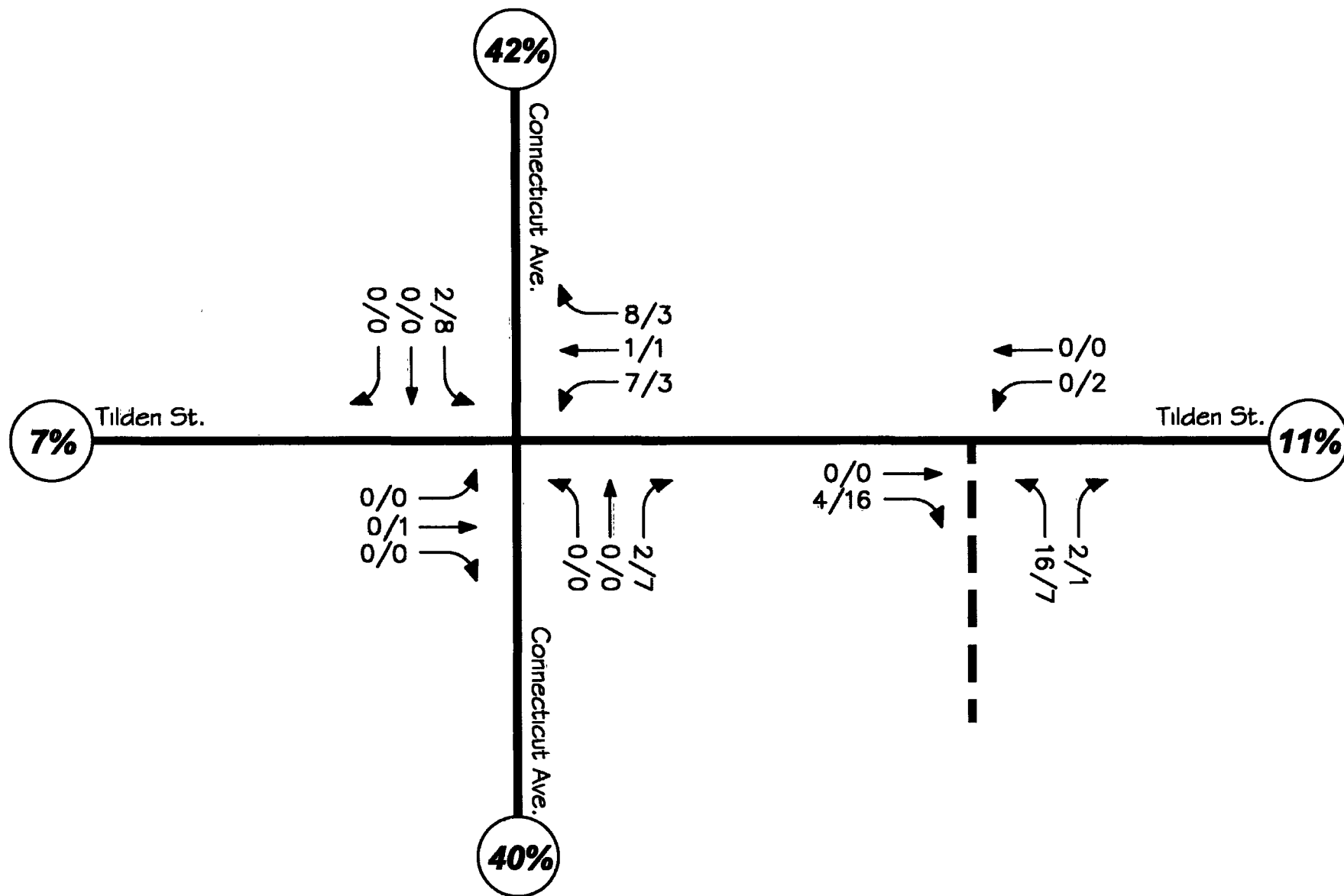


Figure 4-1
Trip Distribution and Assignments

AM PEAK HOUR
PM PEAK HOUR
000/000

North
Schematic

Section 5 TOTAL FUTURE CONDITIONS

Traffic Volumes

The future background traffic volumes shown on Figure 3-2 were combined with the site traffic assignments shown on Figure 4-1 to yield the total future traffic forecasts shown on Figure 5-1.

In order to determine the amount of traffic on the surrounding roadways that would be attributable to the proposed development, a proportional impact assessment was conducted. During both the AM and PM peak hours, less than one percent of the traffic at the Connecticut Avenue/Tilden Street intersection would be attributable to the proposed residential development.

Operational Analysis

A future conditions capacity analysis, with the proposed development, was performed at the Connecticut Avenue/Tilden Street intersection and at the site access intersection on Tilden Street utilizing 2007 projected total future traffic volumes and lane configurations, traffic controls, and traffic signal timings to match the future background analyses. Table 5-1 summarizes the results of the analysis.

With the proposed residential development in place, the signalized intersection of Connecticut Avenue and Tilden Street would continue to operate at the same levels of service as the future background conditions without the proposed development. Although there are slight increases in delay, the delay for any approach or for the overall intersection does not increase by more than fifteen percent.

With stop sign control on the driveway approach, the northbound driveway approach at the proposed site access on Tilden Street would operate at a LOS B during both the AM and PM peak hour. The westbound approach on Tilden Street would operate at a LOS A at the proposed site access.

HCS worksheets are included in Appendix F.

Table 5-1
Total Future Levels of Service

APPROACH	AM PEAK	PM PEAK
Connecticut Avenue/Tilden Street		
EB	F (733.4)	F (814.5)
WB	F (137.8)	F (89.9)
NB	F (244.4)	B (16.9)
SB	B (13.9)	C (22.0)
OVERALL	F (117.1)	F (84.8)
Tilden Street/Site Access		
WB	A [8.1]	A [8.2]
NB	B [13.8]	B [13.8]
(22.2) = Control delay at signalized intersections (sec/veh)		
[22.2] = Control delay at unsignalized intersections (sec/veh)		

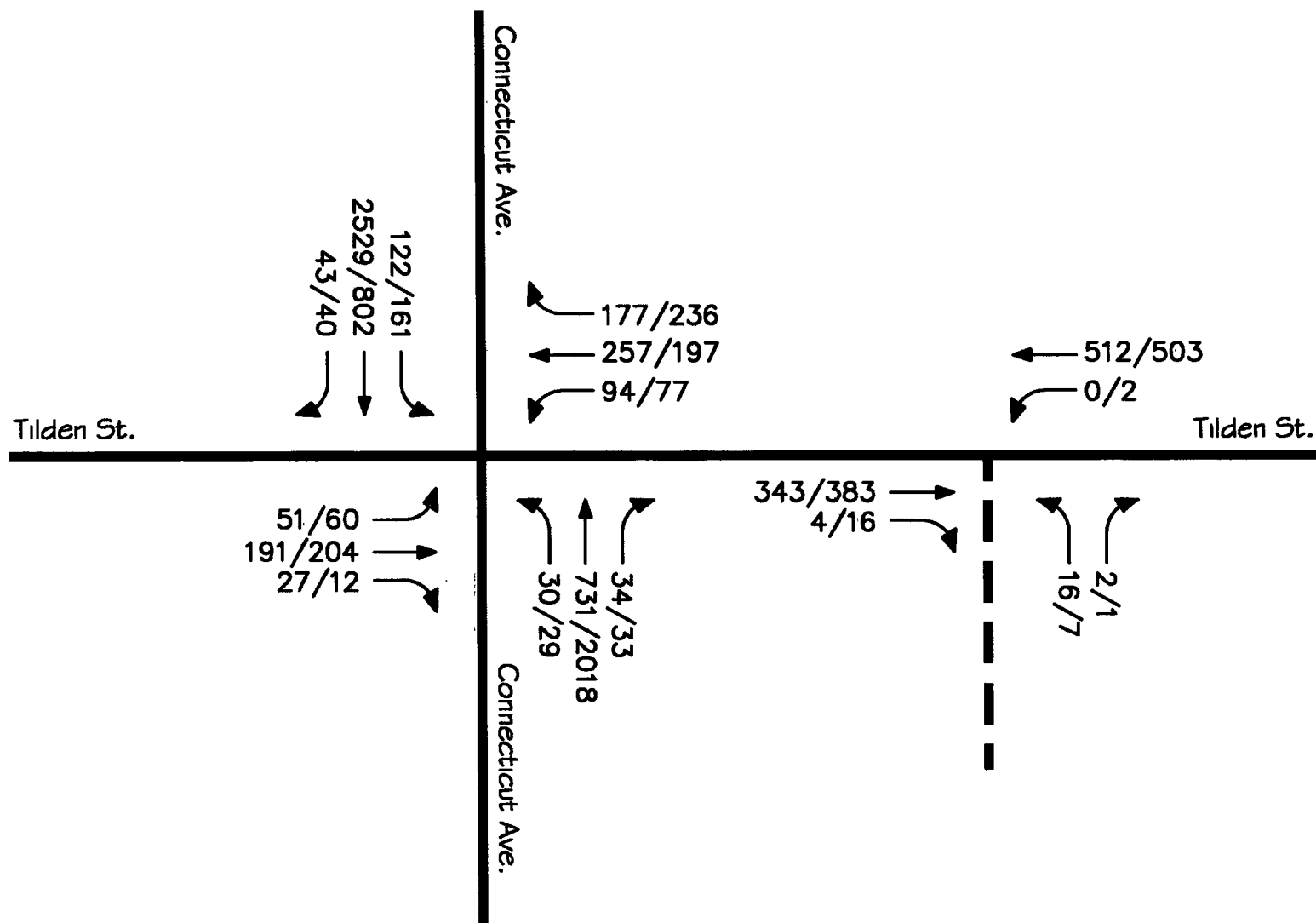


Figure 5-1
Total Future Peak Hour Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000/000



Queue Analysis

Using AASHTO's A Policy on Geometric Design of Highways and Streets¹², a queue analysis was performed at the Connecticut Avenue/Tilden Street intersection under existing conditions, future background conditions without the proposed development and total future conditions with the proposed development. The results of the analysis are summarized in Table 5-3. Queue analysis worksheets are included in Appendix G.

As Table 5-3 shows, compared to the future background conditions without the development, the projected queues under the total future with development conditions slightly increase for the eastbound approach and westbound left/through lane group. The projected queue length is expected to increase by ten feet or less for these movements during the AM and PM peak hours and is considered negligible when compared to the assumed typical car length of 25 feet.

Also of importance to note, the westbound projected queues will be significantly less under the background and total future conditions compared to the queues that are estimated under the existing conditions. This decrease in queuing for the westbound approach is a result of the planned construction of a westbound right-turn lane with overlapping phasing.

Turn Lane Analysis

The need for a left-turn lane at the proposed intersection of Tilden Street and the site access was evaluated using Harmelink's Volume Warrants for Left Turn Storage Lanes at Unsignalized Grade Intersections¹³. Per this analysis, a westbound left-turn lane on 16th Street is not warranted under the 2007 total future conditions. Documentation for this analysis is included in Appendix H.

Table 5-3
Queue Analysis

APPROACH	QUEUE LENGTH (FEET)					
	Existing		Future Background		Total Future	
	AM	PM	AM	PM	AM	PM
Connecticut Avenue/Tilden Street						
EB	165	180	185	190	185	195
WBLT	335	330	235	190	240	190
WBR			60	140	60	140
NB	245	200	255	205	255	205
SB	200	140	205	145	205	145

Section 6 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations of this study are as follows:

1. Currently, the Connecticut Avenue/Tilden Street intersection operates at a failing level of service during the AM and PM peak hours. During the AM peak hour, all approaches except the southbound approach operate unacceptably. During the PM peak hour, the eastbound and westbound approaches fail.
2. Under background conditions, levels of service at the Connecticut Avenue/Tilden Street intersection are expected to remain relatively unchanged from existing conditions. During the AM peak hour, the eastbound approach will drop from a deficient LOS E to a failing level of service. During the PM peak hour, the southbound approach will drop from a LOS B to a LOS C.
3. The proposed residential development is anticipated to generate 22 AM peak hour vehicular-trips, 26 PM peak hour vehicular-trips and 178 daily vehicular-trips.
4. The proposed development would account for less than one percent of the total 2007 AM and PM peak hour traffic volumes at the Connecticut Avenue/Tilden Street intersection.
5. According to the District of Columbia Municipal Regulations, 20 on-site parking spaces would be required for the 60 condominiums. At least 90 on-site parking spaces are proposed for the development.
6. Under total future conditions, levels of service at the Connecticut Avenue/Tilden Street intersection will remain unchanged from the future background conditions without the proposed development. Certain approaches are projected to operate with an insignificant increase in delay.
7. Compared to the future background conditions without the development, queues under the total future with development conditions are expected to slightly increase for the eastbound approach and westbound left/through lane group. These increases are expected to be ten feet or less for any given movement and, therefore, are considered negligible.
8. The proposed site access will operate acceptably under stop control for the northbound driveway approach. No turn lanes are required on Tilden Street at the site access.

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- ⁴ 2001 Traffic Volumes. District Department of Transportation Traffic Services Administration, Washington, D.C.
- ⁵ Highway Capacity Manual. Transportation Research Board, Washington D.C., 2000.
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- ⁷ The Sheridan School Transportation Study, Wells & Associates, LLC, July 29, 2003.
- ⁸ Edmund Burke School Transportation Management Plan, Wells & Associates, LLC, April 14, 2003.
- ⁹ Trip Generation, 7th Edition, Volume 2, Institute of Transportation Engineers, Washington, DC, 2003.
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