

Traffic Impact Analysis



UNION PLACE
Washington, DC

DRAFT

July 20, 2005

Prepared for:
Cohen Companies

ZONING COMMISSION

CASE No. 05-36

EXHIBIT No. ZONING COMMISSION

District of Columbia
CASE NO.05-36
EXHIBIT NO.7



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INTRODUCTION AND SUMMARY OF FINDINGS

Traffic Impact Analysis

UNION PLACE
Washington, DC

Prepared for
Cohen Companies

STUDY PURPOSE

The primary purpose of this analysis is to determine what impact the proposed development of the Union Place Project would have on the adjacent road network in Washington, DC. The Union Place Site is located between K Street to the south and L Street to the north and 2nd Street to the west and 3rd Street to the east. Access to this

property is planned along 2nd Street and L Street.

STUDY CRITERIA/METHODOLOGY

This Traffic Impact Analysis was prepared in accordance with the procedures required for the conduct of a Traffic Impact Study. Intersection Capacity Analyses were conducted using the Highway Capacity Manual (HCM) Methodology as appropriate for signalized and unsignalized intersections. The trip generation determinations made as part of this report were based on information contained in the Institute of Transportation Engineers (ITE) Trip Generation Report (7th Edition).

SCOPE OF SERVICES

The principal scope of services undertaken as part of this study was as follows.

- *Field investigation to collect physical information concerning the nearby road system to include condition diagrams and a photo survey of each of the study area intersections.*
- *Conduct intersection turning movement counts from 7 to 9 AM and 4 to 6 PM at each of the study area intersections.*
- *Projection of traffic to account for other planned developments in the vicinity of the subject site.*
- *Conduct a Trip Generation and Trip Distribution Analysis for the proposed development of Union Place.*

Traffic Impact Analysis
Union Place
Washington, DC



- *Conduct Intersection Capacity Analyses to determine existing and projected levels of service at the key intersections.*
-

SUMMARY OF FINDINGS AND RECOMMENDATIONS

This Traffic Impact Analysis was conducted to determine what impact the proposed development of the Union Place Project would have on the adjacent road network in Washington, DC. Intersection Capacity Analyses were conducted using the appropriate methodology as contained in the HCM for signalized and unsignalized intersections.

The results of the analysis contained in this report indicate that all of the study area intersections are presently operating at satisfactory levels of service during both the morning and evening peak periods. The addition of traffic from other planned developments, as well as traffic projected to be generated by the Union Place Project will not result in any projected failing traffic conditions. All of the study area intersections are projected to continue to operate at satisfactory levels of service during both the morning and evening peak periods.

Therefore, based on the above information, it is our opinion that the proposed development of the Union Place Project would not have an adverse effect on the nearby road system.

The data and methodology used to undertake this study is detailed in the sections that follow.

EXISTING TRAFFIC CONDITIONS

SITE INFORMATION

The Union Place Site is located between L Street to the north, K Street to the south, 2nd Street to the west, and 3rd Street to the east as shown on Exhibit 1. Access to the subject property is planned along 2nd Street and along L Street.

STUDY AREA

Based on the location of the subject property, the following intersections were identified to be included in this analysis. These intersections are as follows:

-
-
- 2nd Street and L Street
 - 2nd Street and K Street
 - 3rd Street and L Street
 - 3rd Street and K Street
-
-

K Street is a four (4) lane east/west roadway with parking permitted on both sides of the roadway east of 2nd Street. Sufficient area was provided along K Street at its intersection with 3rd Street to allow for the bypassing of left turning vehicles. The posted speed limit along K Street is 25 MPH.

2nd Street is essentially a two (2) lane north/south roadway with a posted speed limit of 25 MPH. The intersection of 2nd Street and K Street is presently signalized. The intersection of 2nd Street and L Street is controlled by a four (4) way stop condition.

3rd Street is also a two (2) lane north/south roadway with a posted speed limit of 25 MPH. The intersection of 3rd Street and K Street is presently controlled by a traffic signal. The intersection of 3rd Street and L Street presently operates as a four (4) way stop condition.

L Street is a two (2) lane east/west roadway with a posted speed limit of 25 MPH.

Exhibit 2 has been prepared to show the existing lane use and existing traffic control at each of the study area intersections. Condition diagrams and a photo survey for each of the study area intersections is contained in Appendix A to this report.

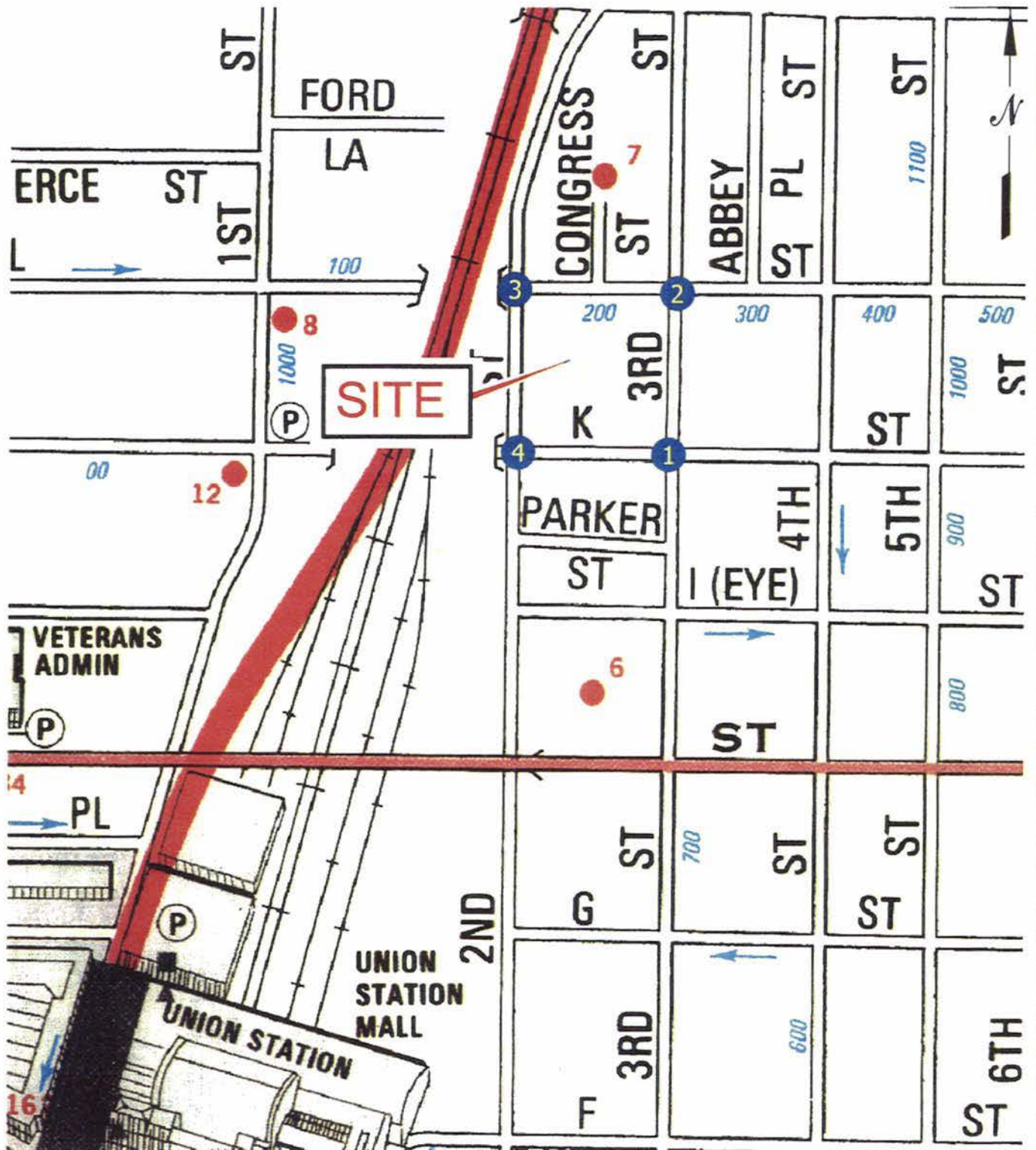
TRAFFIC VOLUMES

The Traffic Group, Inc. conducted intersection turning movement counts at each of the study area intersections from 7 to 9 AM and 4 to 6 PM on a weekday. The total vehicles observed during these counts are shown on the summary sheets contained in Appendix A. The existing peak hour volumes are shown on Exhibit 3.

ANALYSIS OF EXISTING TRAFFIC CONDITIONS

Intersection Capacity Analyses were conducted for each of the study area intersections using the appropriate HCM Methodology and the results are shown on Exhibit 10. Copies of the capacity worksheets are contained in Appendix B to this report.

A review of Exhibit 10 indicates that all of the study area intersections are presently operating at satisfactory levels of service during both the morning and evening peak periods.

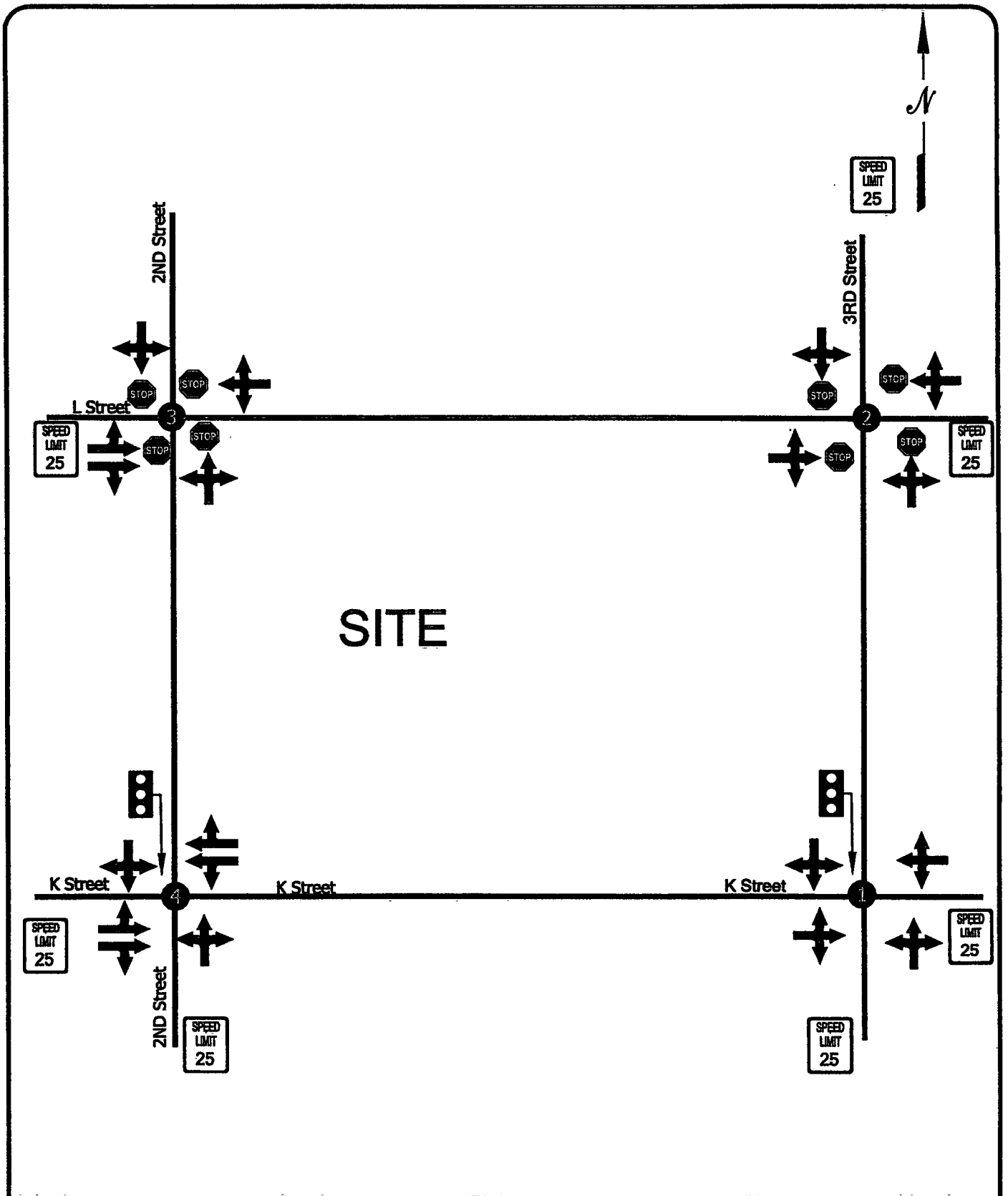


ADC Permitted Use Number 20303127



Study Location

EXHIBIT 1
SITE LOCATION MAP

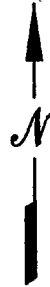
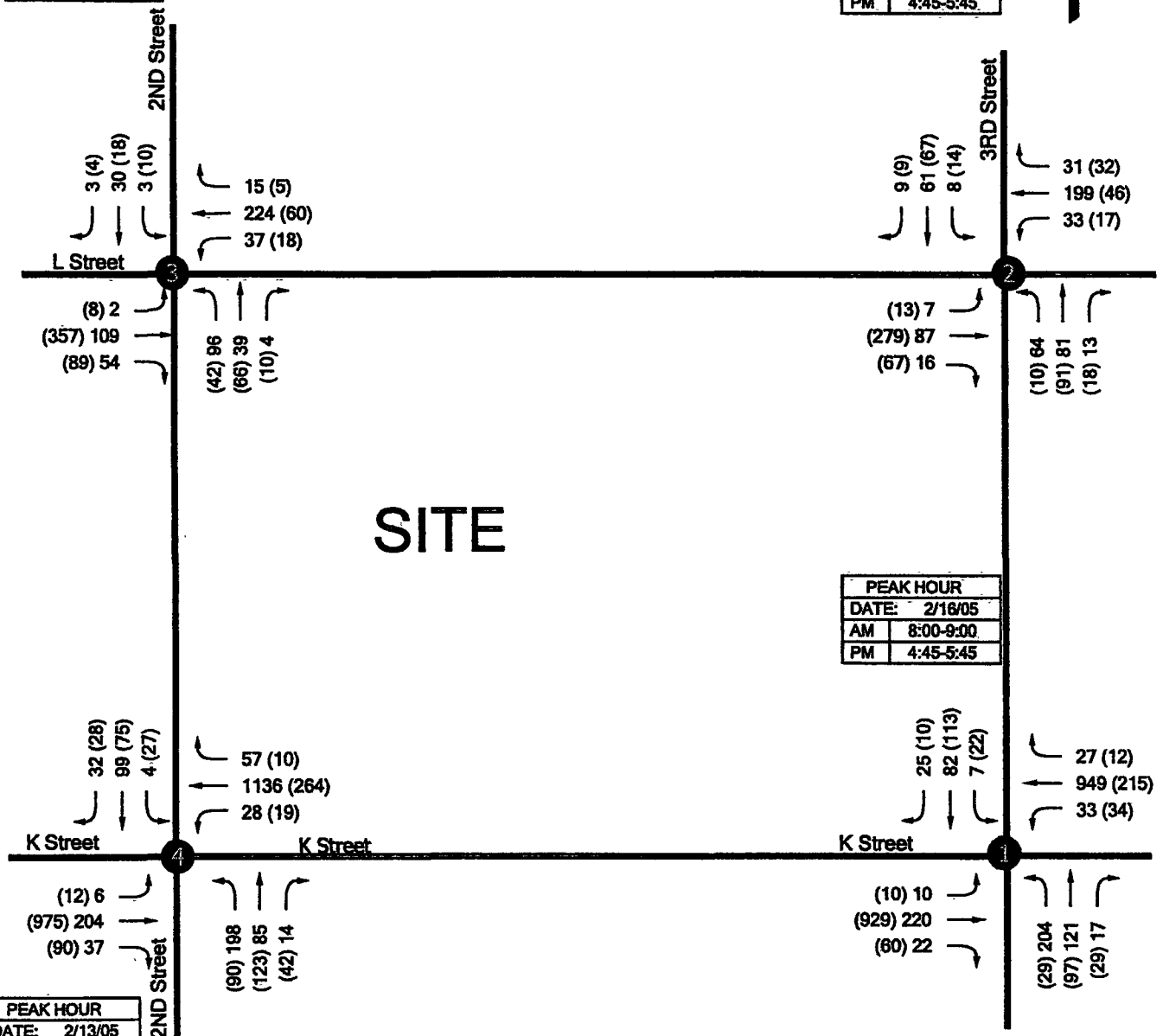


NOT TO SCALE

EXHIBIT 2
EXISTING LANE USE

PEAK HOUR	
DATE:	2/13/05
AM	8:00-8:00
PM	4:30-5:30

PEAK HOUR	
DATE:	2/16/05
AM	8:00-9:00
PM	4:45-5:45



PEAK HOUR	
DATE:	2/16/05
AM	8:00-9:00
PM	4:45-5:45

PEAK HOUR	
DATE:	2/13/05
AM	8:00-9:00
PM	4:30-5:30

NOTE:
ALL INTERSECTIONS MAY NOT HAVE
SIMULTANEOUS PEAK HOURS.



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

EXHIBIT 3 EXISTING PEAK HOUR TRAFFIC VOLUMES

BACKGROUND TRAFFIC CONDITIONS

DESIGN YEAR(S)

In order to develop the background traffic conditions for this analysis, traffic projected to be generated by other nearby developments was also included in this analysis. It was determined that there are three (3) other developments that are planned in the vicinity of the subject site that would have a direct impact on the adjacent roadways. The location of these developments are shown on Exhibit C1 contained in Appendix C. A list of these developments is shown on Exhibit 4.

TRIP GENERATION FOR NEARBY DEVELOPMENTS

In order to determine the amount of traffic projected to be generated by the other nearby developments, we consulted the ITE Trip Generation Report (7th Edition) to prepare Exhibit 4 which shows the trip generation rates and the peak hour trips projected to be generated by each of these nearby developments.

The peak hour trips shown on Exhibit 4 were then distributed and assigned to the nearby road system as shown on Exhibits C2 through C4 contained in Appendix C. The combined impact of these three (3) developments is shown on Exhibit 5.

Combining the peak hour trips projected to be generated by the nearby developments with the existing peak hour volumes results in the background peak hour volumes shown on Exhibit 6.

ANALYSIS OF BACKGROUND TRAFFIC CONDITIONS

Intersection Capacity Analyses were conducted for each of the study area intersections and the results are shown on Exhibit 10. Copies of the capacity worksheets are contained in Appendix B to this report.

A review of Exhibit 10 indicates that each of the study area intersections are projected to continue to operate at satisfactory levels of service during both the morning and evening peak periods.

TRIP GENERATION FOR BACKGROUND DEVELOPMENTS

TRIP RATES / FORMULAE IN/OUT

Low Rise Condominium Units (ITE-231, Units)

Morning Trips = 0.67 x Units 25/75

Evening Trips = 0.78 x Units 59/41

Residential Condominium Units (ITE-230, Units)

Ln(Morning Trips) = 0.80 x Ln(Units) + 0.26 17/83

Ln(Evening Trips) = 0.82 x Ln(Units) + 0.32 67/33

TOTAL TRIPS

MORNING PEAK HOUR			EVENING PEAK HOUR		
IN	OUT	TOTAL	IN	OUT	TOTAL

Development #1

Low Rise Condo Units (ITE-231, Units)

44 units	7	22	29	20	15	35
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Development #2 (Capitol Cab Site)

Low Rise Condo Units (ITE-231, Units)

112 units	19	56	75	51	37	88
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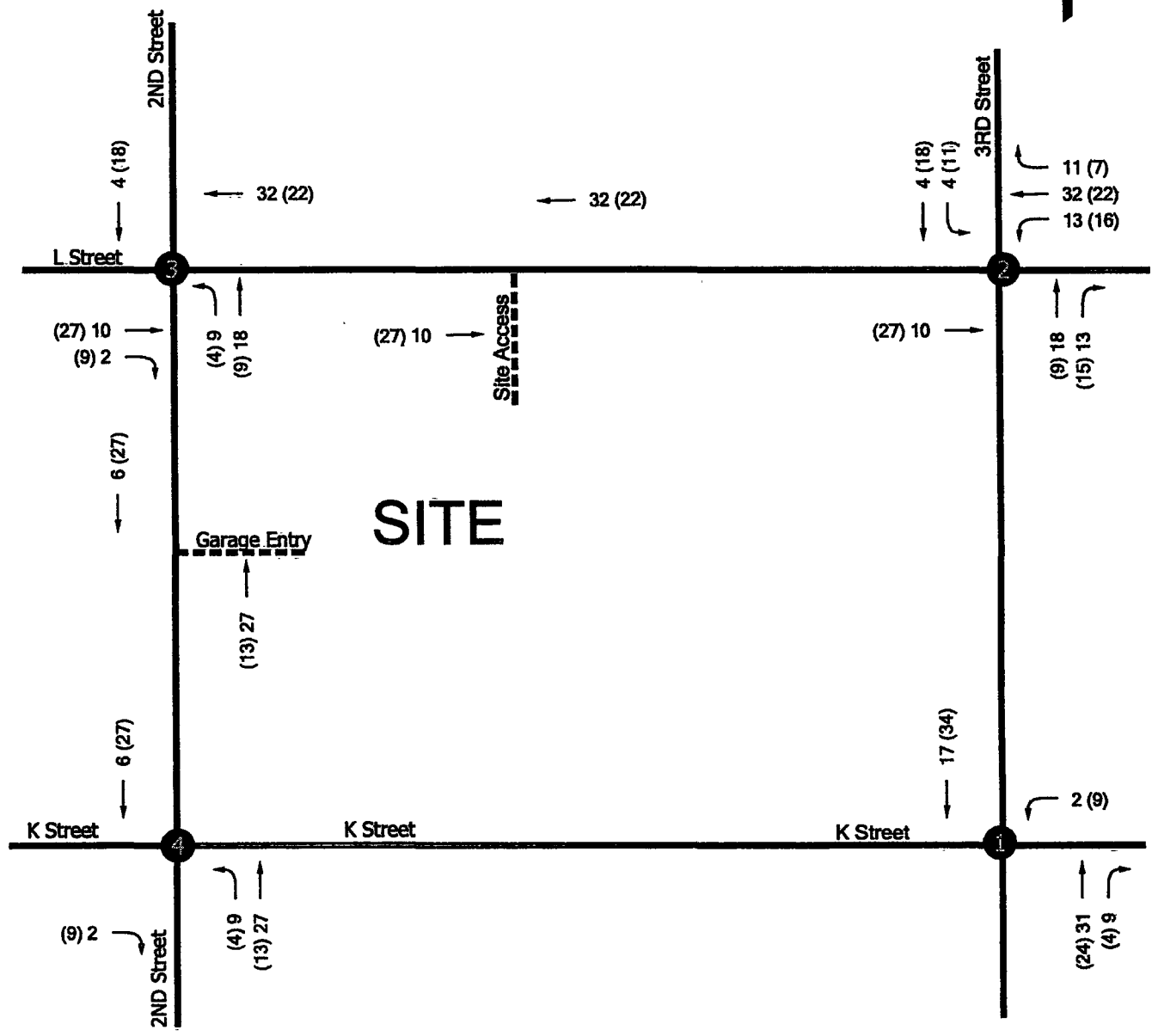
Development #3: The Children's Museum

Residential Condominium Units (ITE-230, Units)

600 units	37	179	216	175	86	261
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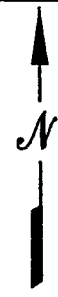
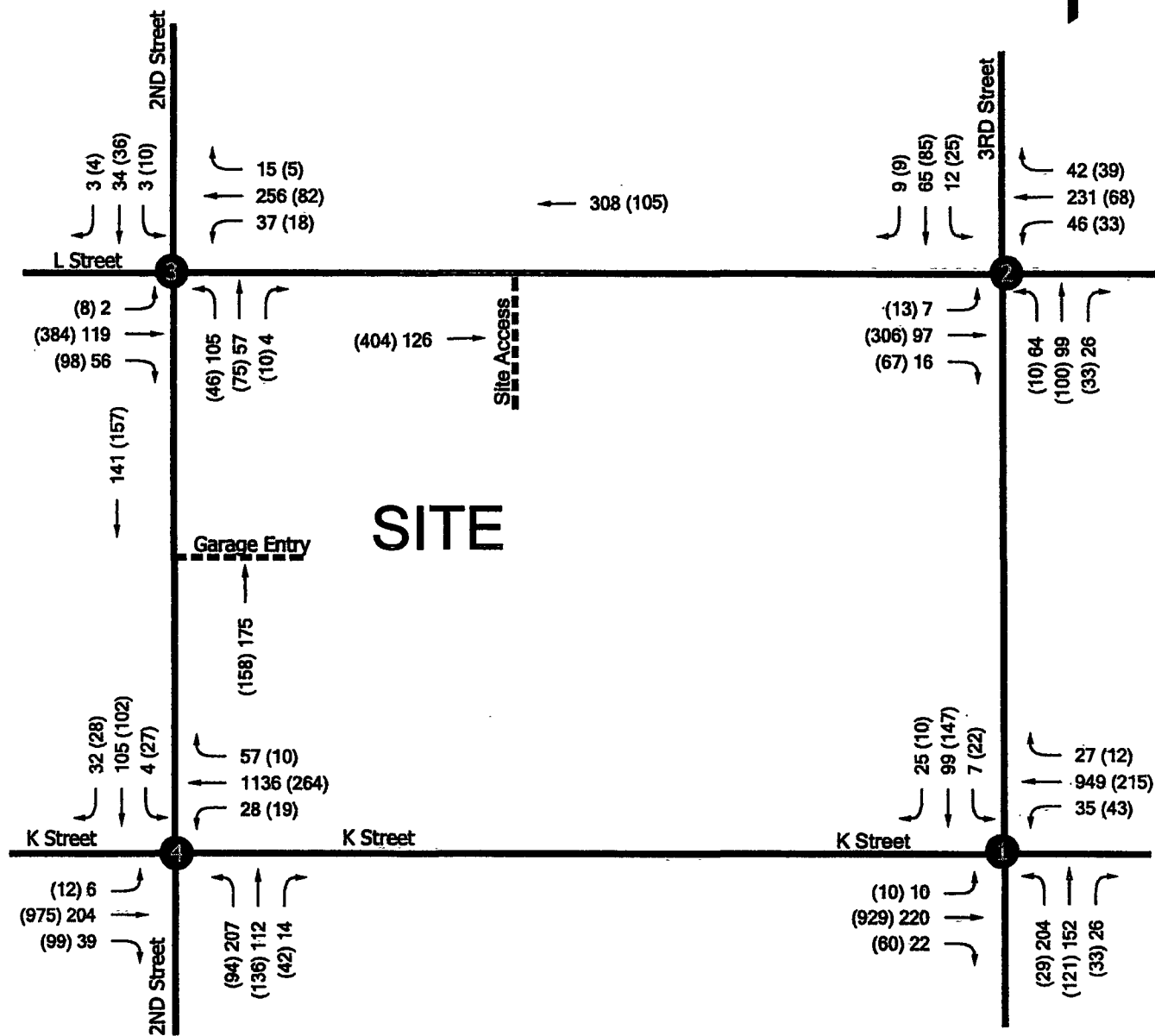
EXHIBIT 4 TRIP GENERATION FOR BACKGROUND DEVELOPMENTS



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

EXHIBIT 5 COMBINED TRIPS GENERATED BY APPROVED DEVELOPMENTS



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

EXHIBIT 6 BACKGROUND PEAK HOUR TRAFFIC VOLUMES

TOTAL TRAFFIC CONDITIONS

SITE INFORMATION

As previously discussed, the Union Place Site is planned to be located between L Street to the north, K Street to the south, 2nd Street to the west, and 3rd Street to the east. Access to this property is planned along 2nd Street and L Street. The Union Place Site is planned to be developed with the following uses:

- 418 high rise condo units
- 303,602 square feet of general office space
- 19,217 square feet of retail space

It should be noted that the Union Place Site may be developed with an additional 260 condo units in place of the office space listed above. For the purpose of this analysis, we have assumed the development of the office space which would generate significantly more traffic than the 260 condo units in order to present a worst case scenario. This difference will be discussed in more detail later in this report.

TRIP GENERATION/DISTRIBUTION

In order to determine the amount of traffic projected to be generated by the Union Place Development, we consulted the ITE Trip Generation Report (7th Edition) to prepare Exhibit 7 which shows the trip generation rates and the peak hour trips projected to be generated by the subject site. It should be noted that the retail trips have been adjusted to reflect "pass-by" trips. "Pass-by" trips are trips that would already be on the road system and would patronize the new retail space as part of another primary trip. While these trips do not impact off-site intersections, they would impact the access points to the subject site. Due to the location of the subject site, a portion of this retail traffic would be generated by foot traffic. However, this has not been taken into consideration in this analysis to provide a conservative approach to our analysis.

As discussed previously, the 303,602 square feet of office space may be eliminated and replaced with 260 additional condo units. A trip generation comparison is shown on Exhibit 7 which indicates that the office space would generate approximately 352 more trips during the morning peak hour and 315 more trips during the evening peak hour than the additional condo units. Therefore, this analysis evaluates the impact of the office space in order to determine the maximum impact of this site.

The peak hour trips projected to be generated by each of the uses, assuming the development of the office space, shown on Exhibit 7 were then distributed and assigned to the nearby road system as shown on Exhibits 8A through 8D. Combining

the peak hour trips to be generated by the subject site with the background peak hour volumes results in the total peak hour traffic volumes shown on Exhibit 9.

ANALYSIS OF TOTAL TRAFFIC CONDITIONS

Intersection Capacity Analyses were conducted for each of the study area intersections using the appropriate methodology as contained in the HCM. The results of these analyses are shown on Exhibit 10. Copies of capacity worksheets are contained in Appendix B of this report.

A review of Exhibit 10 indicates that with the development of the Union Place Site, all of the study area intersections are projected to continue to operate at satisfactory levels of service during both the morning and evening peak periods.

TRIP GENERATION FOR UNION PLACE

TRIP RATES / FORMULAE

IN/OUT

High Rise Condo Units (ITE-232, Units)

Morning Trips = $0.29 \times \text{Units} + 28.86$ 19/81

Evening Trips = $0.34 \times \text{Units} + 15.47$ 62/38

General Office (ksf, ITE-710)

Ln(Morning Trips) = $0.80 \times \text{Ln(ksf)} + 1.55$ 88/12

Evening Trips = $1.12 \times (\text{ksf}) + 78.81$ 17/83

Shopping Center (ksf, ITE-820)

Morning Trips = $1.03 \times \text{ksf}$ 61/39

Evening Trips = $3.75 \times \text{ksf}$ 48/52

TRIP TOTALS

MORNING PEAK HOUR			EVENING PEAK HOUR		
IN	OUT	TOTAL	IN	OUT	TOTAL

Union Place

High Rise Condo Units (ITE-232, Units)

418 units 28 122 150 98 60 158

General Office (ksf, ITE-710)

303,602 sq.ft. 401 55 456 71 348 419

Shopping Center (ksf, ITE-820)

19,217 sq.ft. 12 8 20 35 37 72

Pass-by Trips -6 -4 -10 -21 -22 -43

New Trips **6** **4** **10** **14** **15** **29**

Total	435	181	616	183	423	606
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Trip Comparison between 303,602 sq.ft. General Office and 260 High Rise Condo Units

General Office (ksf, ITE-710)

303,602 sq.ft. 401 55 456 71 348 419

High Rise Condo Units (ITE-232, Units)

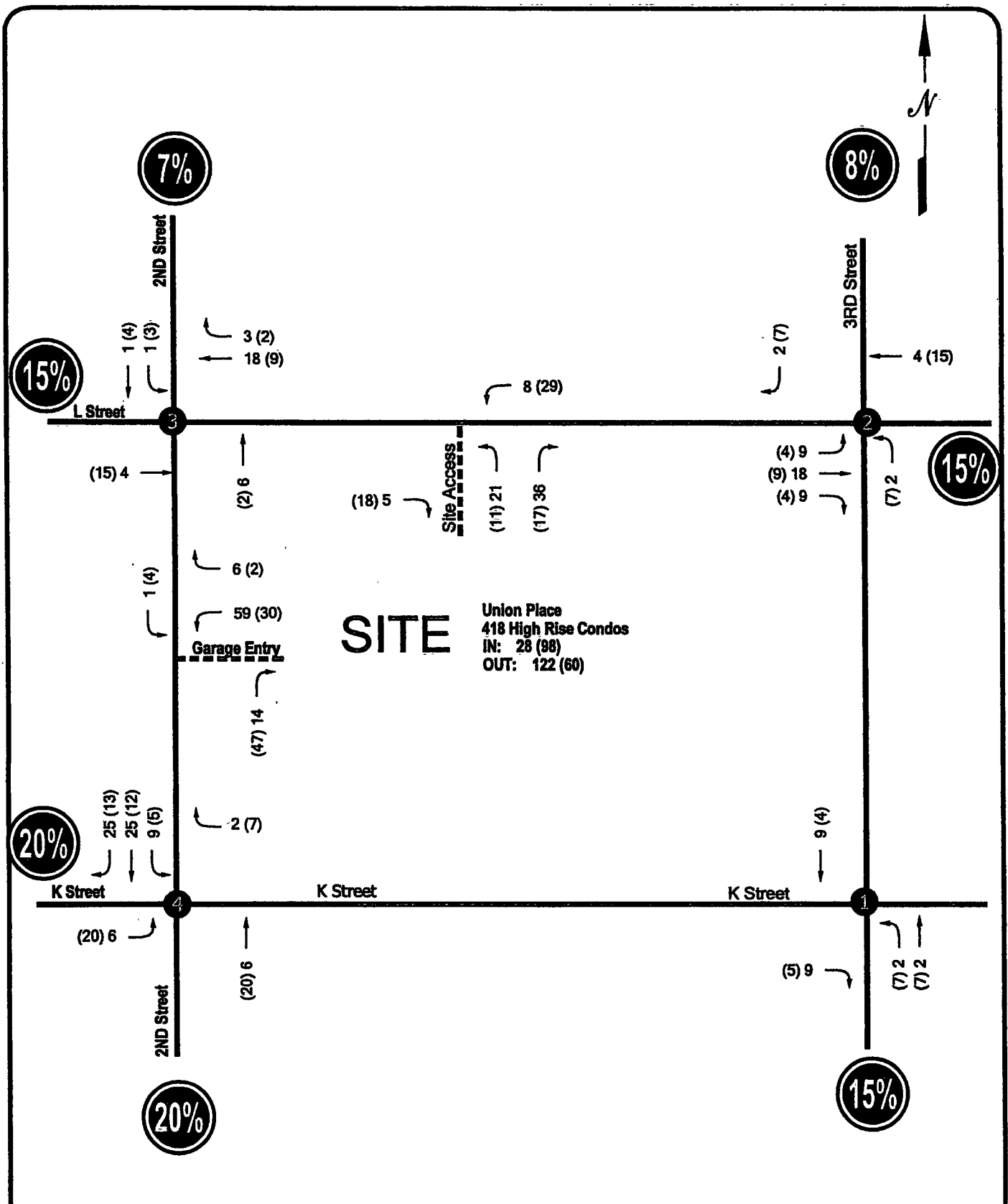
260 units 20 84 104 64 40 104

Difference	381	-29	352	7	308	315
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Note: Trip Generation Rates obtained from
ITE Trip Generation, 7th Edition.

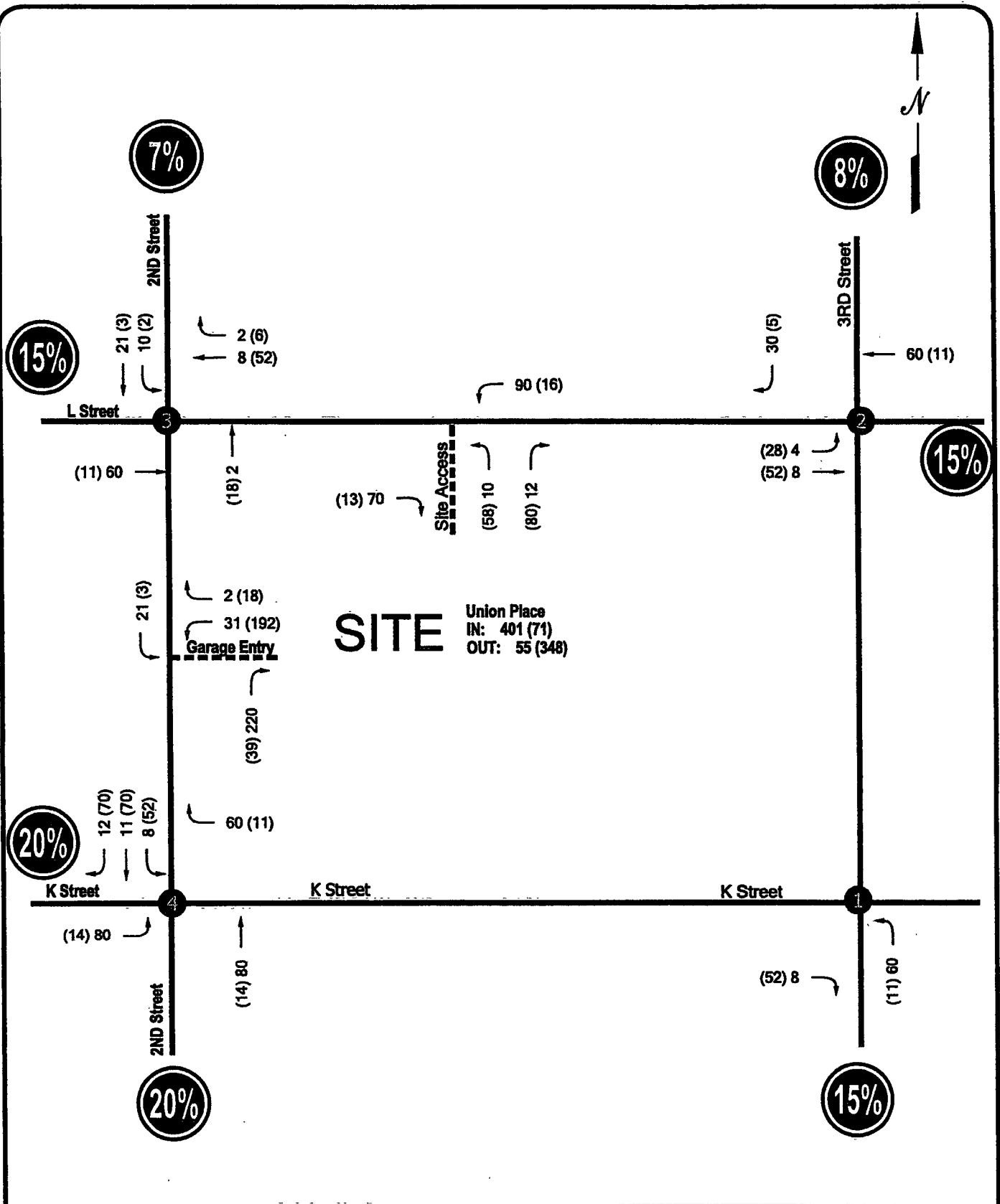
EXHIBIT 7 TRIP GENERATION FOR UNION PLACE



NOT TO SCALE

00 - MORNING PEAK HOUR
 (00) - EVENING PEAK HOUR

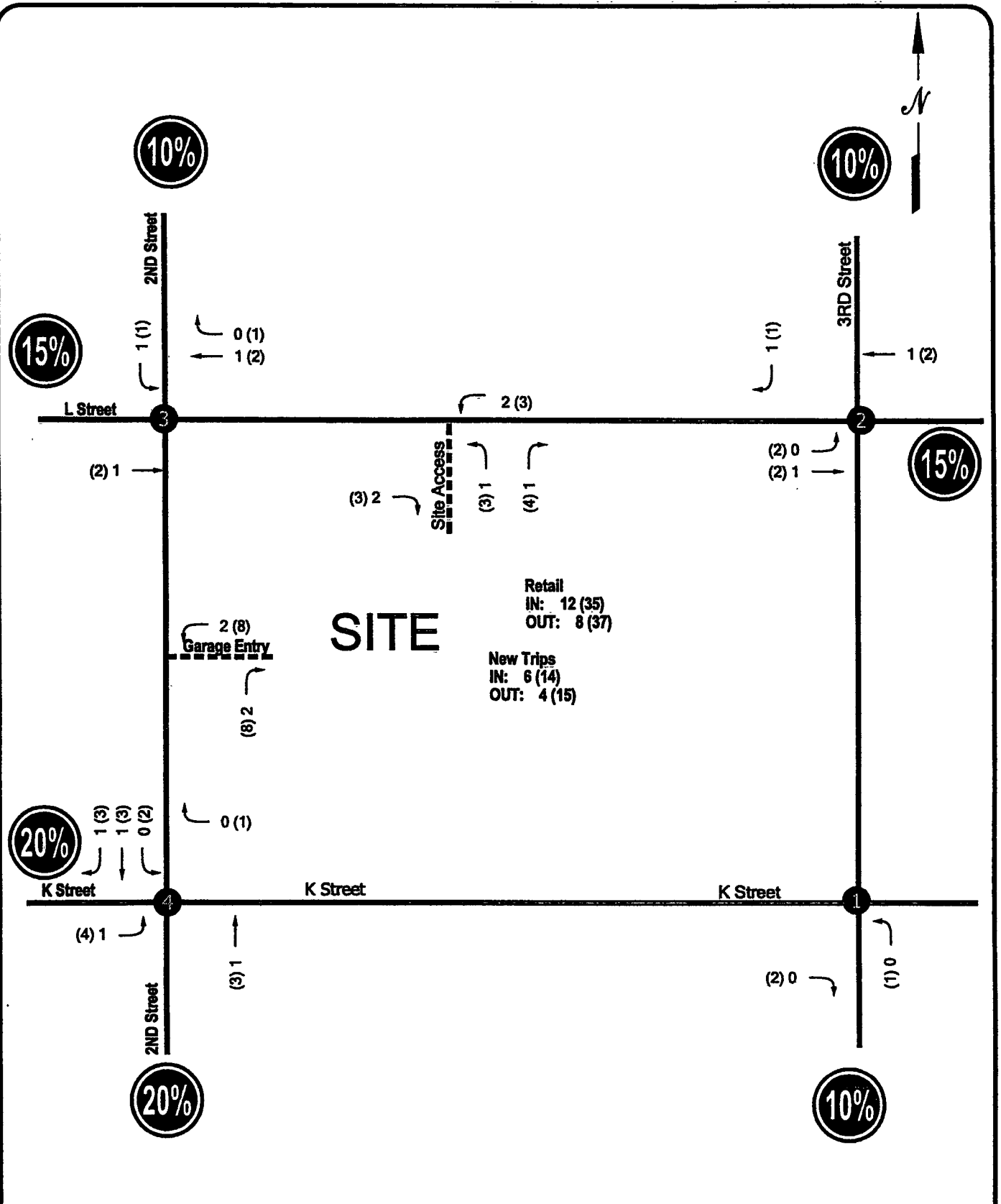
EXHIBIT 8A TRIP ASSIGNMENT FOR UNION PLACE (CONDOMINIUMS)



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

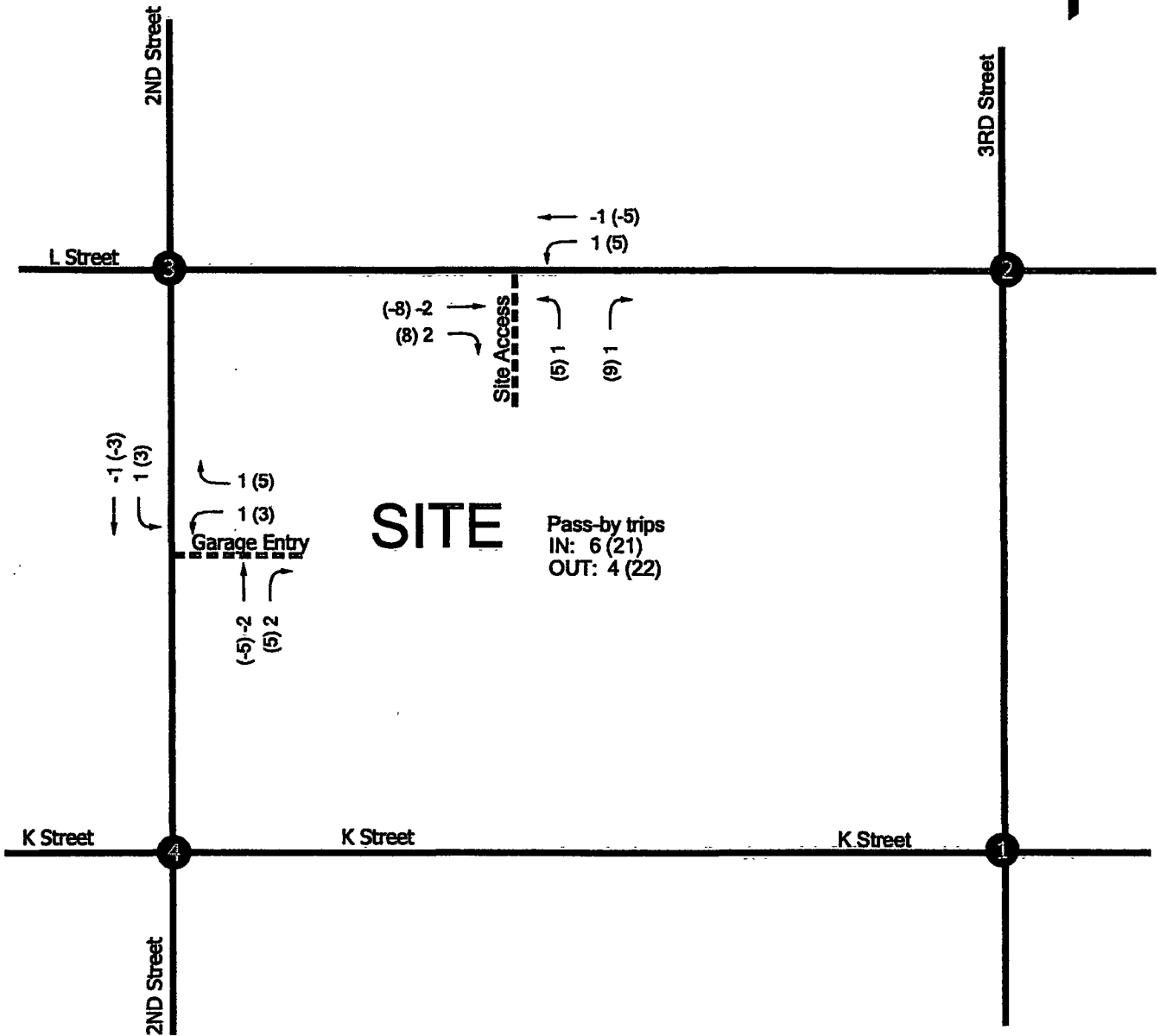
EXHIBIT 8B TRIP ASSIGNMENT FOR UNION PLACE (OFFICE)



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

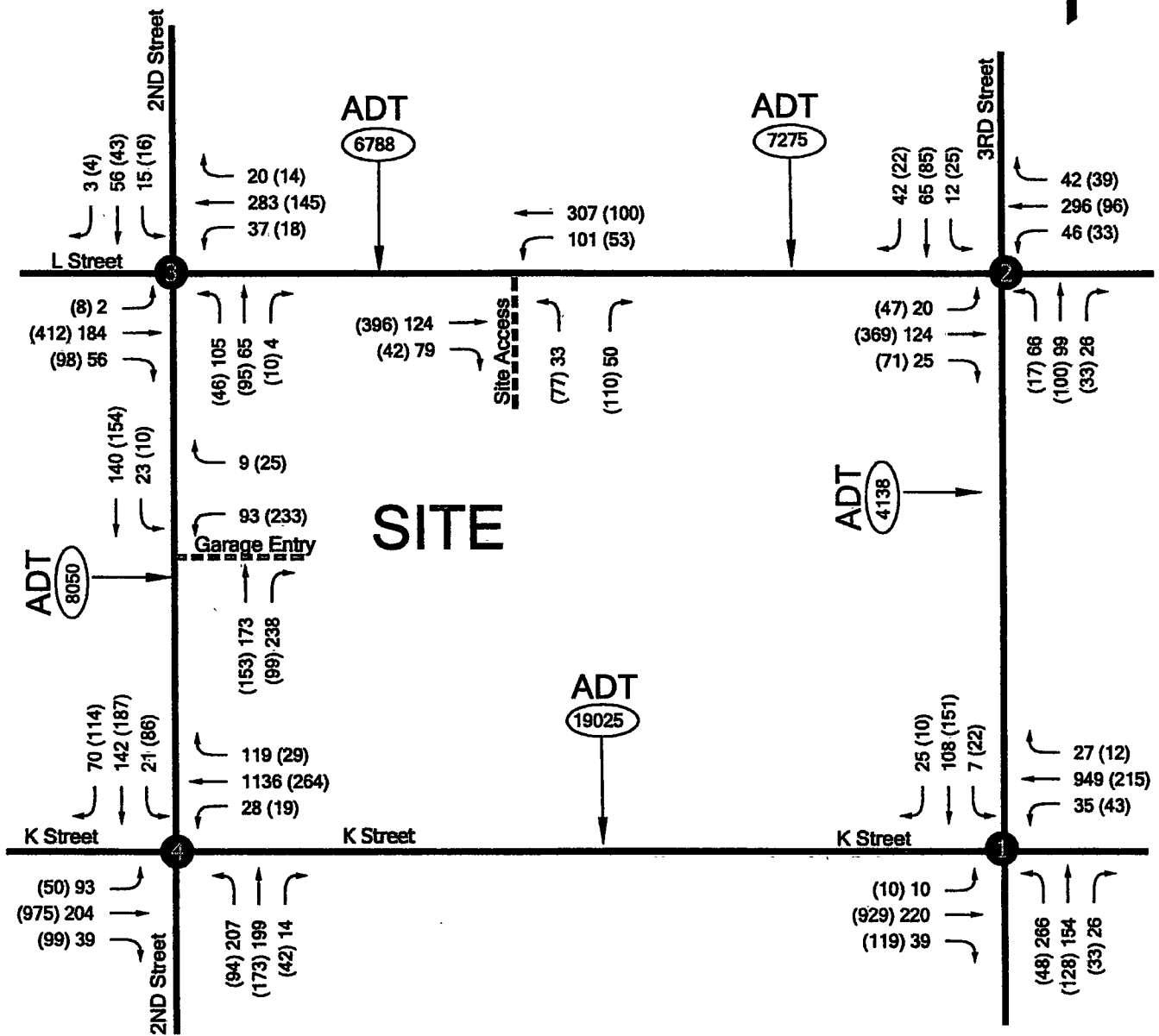
EXHIBIT 8C TRIP ASSIGNMENT FOR UNION PLACE #2 (RETAIL)



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

EXHIBIT 8D EFFECTS OF PASS-BY TRIPS GENERATED BY UNION PLACE



NOTE:
It is assumed that morning peak hour volumes account for 8% ADT.



NOT TO SCALE

00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

EXHIBIT 9 TOTAL PEAK HOUR TRAFFIC VOLUMES

RESULTS, RECOMMENDATIONS, and CONCLUSIONS

STUDY PURPOSE

The primary purpose of this analysis was to determine what impact the proposed development of the Union Place Project would have on the adjacent road network in Washington, DC. The Union Place Site is located between K Street to the south and L Street to the north and 2nd Street to the west and 3rd Street to the east. Access to this property is planned along 2nd Street and L Street.

STUDY CRITERIA/METHODOLOGY

This Traffic Impact Analysis was prepared in accordance with the procedures required for the conduct of a Traffic Impact Study. Intersection Capacity Analyses were conducted using the HCM Methodology as appropriate for signalized and unsignalized intersections. The trip generation determinations made as part of this report were based on information contained in the ITE Trip Generation Report (7th Edition).

SUMMARY OF FINDINGS AND RECOMMENDATIONS

This Traffic Impact Analysis was conducted to determine what impact the proposed development of the Union Place Project would have on the adjacent road network in Washington, DC. Intersection Capacity Analyses were conducted using the appropriate methodology as contained in the HCM for signalized and unsignalized intersections.

The results of the analysis contained in this report indicate that all of the study area intersections are presently operating at satisfactory levels of service during both the morning and evening peak periods. The addition of traffic from other planned developments, as well as traffic projected to be generated by the Union Place Project will not result in any projected failing traffic conditions. All of the study area intersections are projected to continue to operate at satisfactory levels of service during both the morning and evening peak periods. This conclusion is based on the data as outlined in this report, which assumed the uses that would result in the highest traffic generation scenario for this site.

Therefore, based on the above information, it is our opinion that the proposed development of the Union Place Project would not have an adverse effect on the nearby road system.

	Existing Traffic	Background Traffic	Total Traffic
MORNING PEAK HOUR	LOS / DELAY*	LOS / DELAY*	LOS / DELAY*
1. K Street & 3rd Street ¹	D / 39.7	D / 43.7	D / 45.2
2. L Street & 3rd Street			
Eastbound LTR	A / 9.21	A / 9.47	B / 10.89
Westbound LTR	B / 11.31	B / 12.50	C / 16.46
Northbound LTR	B / 10.25	B / 10.73	B / 11.92
Southbound LTR	A / 9.15	A / 9.46	B / 10.46
3. L Street & 2nd Street			
Eastbound LTR	A / 8.77	A / 8.97	A / 9.89
Westbound LTR	B / 12.61	B / 12.41	B / 14.77
Northbound LTR	B / 10.11	B / 10.53	B / 11.51
Southbound LTR	A / 8.90	A / 8.97	A / 9.98
4. K Street & 2nd Street ¹	C / 26.5	C / 26.9	C / 31.6
5. L Street & Site Access			
Westbound LT	—	—	A / 7.9
Northbound LR	—	—	B / 13.0
6. 2nd Street & Site Access			
Southbound LT	—	—	A / 8.3
Westbound LR	—	—	B / 14.2
EVENING PEAK HOUR			
1. K Street & 3rd Street ¹	C / 24.5	C / 26.3	C / 27.5
2. L Street & 3rd Street			
Eastbound LTR	B / 13.01	B / 14.64	C / 23.79
Westbound LTR	A / 9.10	A / 9.83	B / 11.03
Northbound LTR	A / 9.72	B / 10.36	B / 11.50
Southbound LTR	A / 9.58	B / 10.25	B / 11.29
3. L Street & 2nd Street			
Eastbound LTR	B / 10.36	B / 10.75	B / 11.77
Westbound LTR	A / 8.95	A / 9.26	B / 10.66
Northbound LTR	A / 9.97	A / 9.98	B / 10.92
Southbound LTR	A / 8.81	A / 9.09	A / 9.78
4. K Street & 2nd Street ¹	C / 20.7	C / 21.5	C / 26.9
5. L Street & Site Access			
Westbound LT	—	—	A / 8.5
Northbound LR	—	—	C / 18.1
6. 2nd Street & Site Access			
Southbound LT	—	—	A / 7.8
Westbound LR	—	—	C / 16.6

Note:

* Represents average delay in seconds per vehicle.

¹ Signalized Intersection



EXHIBIT 10
HCM RESULTS OF INTERSECTION
CAPACITY ANALYSES (2005)