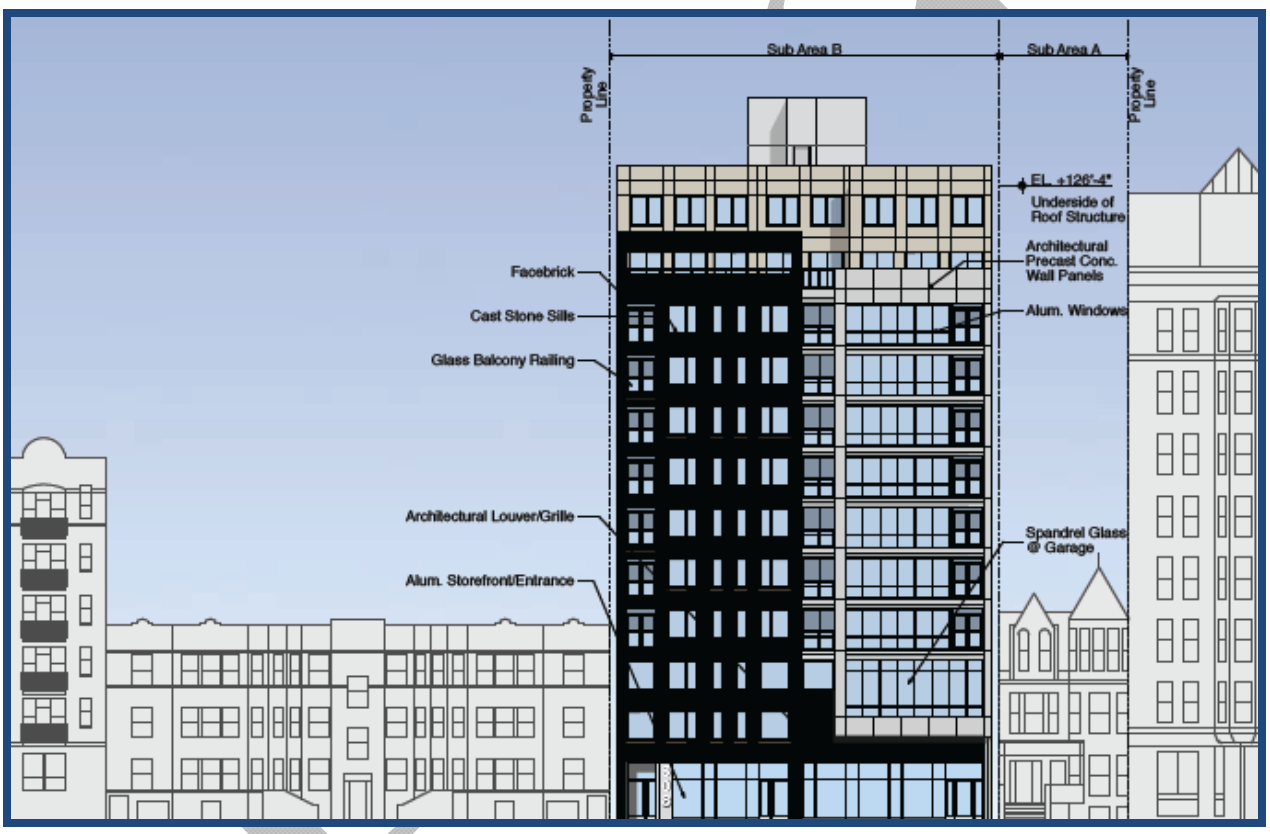
Traffic Impact Study

For

The Proposed 508 West Diversey Parkway Residential Development



Prepared By:

Kenig, Lindgren, O'Hara, Aboona, Inc.

Kenig, Lindgren, O'Hara, Aboona, Inc.

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1.
Introduction

This report summarizes the methodologies, results and findings of a traffic impact study conducted by Kenig, Lindgren, O'Hara, Aboona, Inc. (KLOA, Inc.) for a proposed residential development to be located at 508 West Diversey Parkway in Chicago, Illinois. The site is currently occupied by a surface parking lot and an existing three store structure that contains the Yak-Zies Bar and Grill.

Figure 1 shows the location of the site in relation to the area street system. **Figure 2** shows an aerial view of the area.

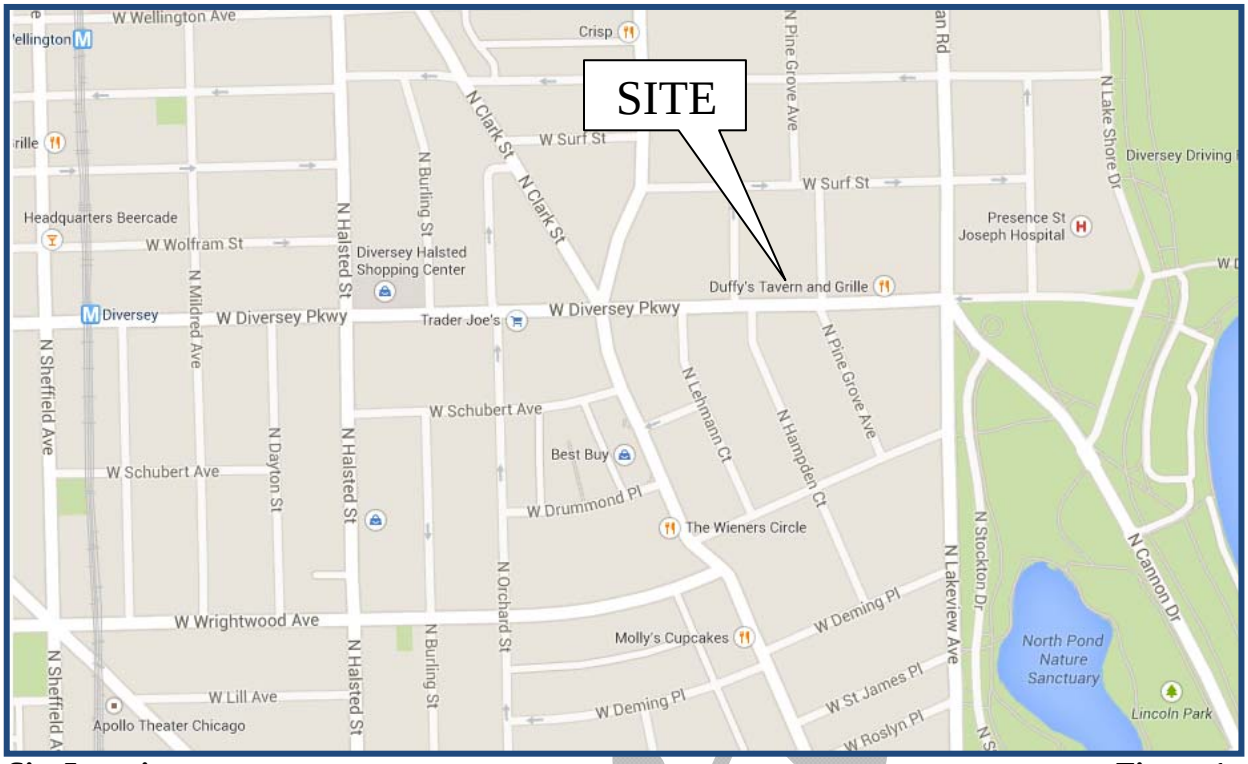
As proposed, the surface parking lot is to be redeveloped to contain a 12-story apartment building with 52 units and approximately 3,100 square feet of ground floor retail. The three-story structure will remain. A total of 53 parking spaces are to be provided internally in a parking garage located on the second and third floors with access to be provided on the east-west alley that runs along the northern border of the site and connects to Pine Grove Avenue and Cambridge Avenue to the east and west, respectively.

The purpose of this study includes the following.

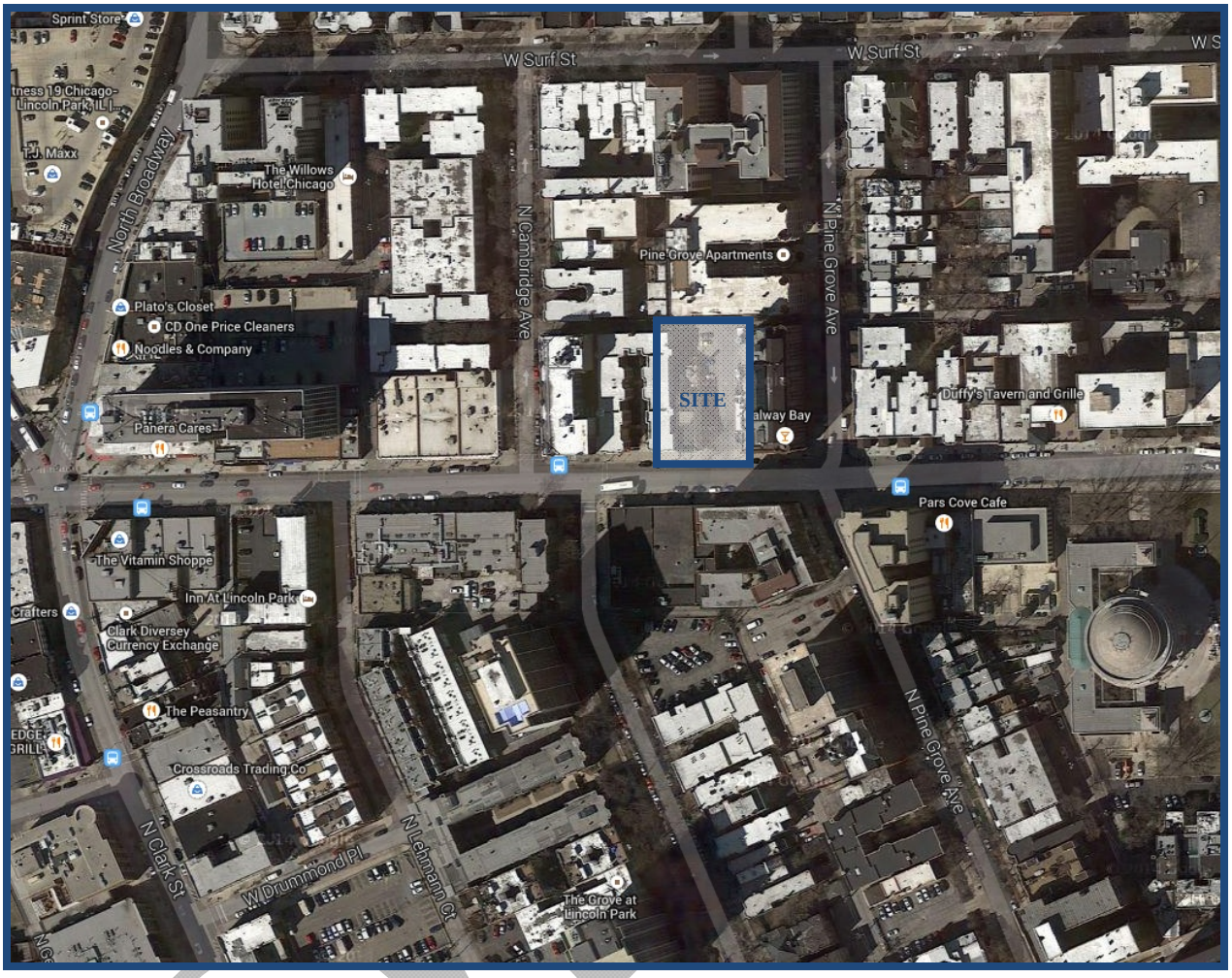
- Determine the existing traffic, pedestrian and bicycle conditions in the area to establish a base condition.
- Assess the impact that the proposed development will have on traffic, pedestrian and bicycle conditions in the area.
- Determine if any street, access, bicycle or pedestrian improvements are necessary to accommodate the proposed development plan.

The following sections of this report present the following.

- Existing street conditions.
- A description of the proposed development plan.
- Directional distribution of development-generated traffic.
- Vehicle trip generation for the proposed development.
- Traffic analyses for the weekday morning and weekday evening peak hours for both the existing and future conditions.
- Recommendations with respect to development access and circulation to the surrounding street network and pedestrian and bicycle facilities for the future condition.



Site Location **Figure 1**



Aerial View of Site Location **Figure 2**

2.
Existing Conditions

Existing street and transportation conditions near the site were documented based on field visits and transportation counts. The following provides a detailed description of the physical characteristics of the streets including geometry and traffic control, adjacent land uses and peak hour traffic flows along area streets.

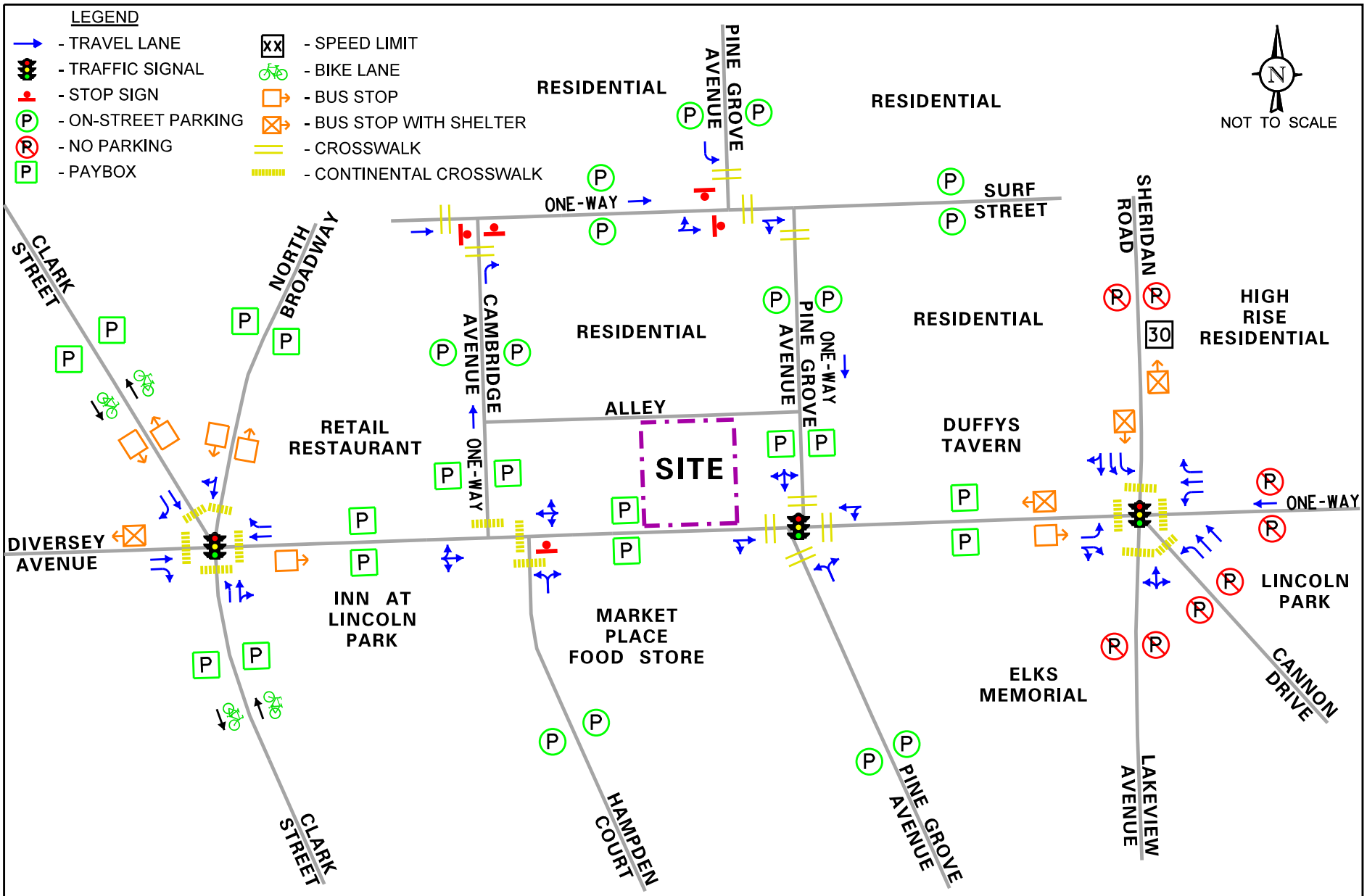
Existing Street System Characteristics

The characteristics of the existing streets near the site are illustrated in **Figure 3** and described below. All streets are under the jurisdiction of the Chicago Department of Transportation (CDOT) unless otherwise noted.

Diversey Parkway is an east-west aligned street that has one lane in each direction with on-street Paybox parking generally permitted on both sides of the street within the study area. At its signalized intersection with Clark Street and North Broadway, Diversey Parkway provides one through lane and one exclusive right-turn lane on both approaches with left-turns prohibited at the intersection. At its signalized intersection with Pine Grove Avenue, Diversey Parkway provides one shared through/left-turn lane on its east approach and one shared through/right-turn lane on its west approach. At its signalized intersection with Sheridan Road, Cannon Drive and Lakeview Avenue, Diversey Parkway provides one left-turn lane, one through lane and one right-turn lane on its east approach and one left-turn lane and one right-turn lane on its west approach. East of Sheridan Road, Diversey Parkway is restricted to one-way westbound traffic. CTA Bus Route 76 runs along Diversey Parkway and bus stops are provided on Diversey Parkway at area intersections. Diversey Parkway has a posted speed limit of 30 mph and carries an Average Daily Traffic (ADT) volume of 13,600 vehicles.

Sheridan Road is a north-south street that provides two travel lanes in each direction within the vicinity of the site. At its signalized intersection with Diversey Parkway, Cannon Drive and Lakeview Avenue, Sheridan Road forms the north leg of the intersection and provides two exclusive left-turn lanes and one shared through/right-turn lane on its north approach. Bus stops are provided on Sheridan Road on both sides of the street. Sheridan Road has a posted speed limit of 30 mph and parking is prohibited on both sides of the street.

Lakeview Avenue is a north-south street that provides one travel lane in each direction. At its signalized intersection with Diversey Parkway, Cannon Drive and Sheridan Road, Lakeview Avenue provides one shared left-turn/through/right-turn lane on its south approach. Parking is prohibited within the vicinity of the intersection.



PROJECT:
508 Diversey
Mixed-Use Development
Chicago, Illinois

TITLE:
Existing Street Characteristics

KLOA
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Figure: 3

Cannon Drive is a northwest-to-southeast street that extends through Lincoln Park. At its terminus intersection with Diversey Parkway, Sheridan Road and Lakeview Avenue, Cannon Drive provides one exclusive left-turn lane and two exclusive right-turn lanes on its southeast approach. Cannon Drive has a posted speed limit of 30 mph and parking is prohibited on both sides of the street.

Clark Street is a northwest-to-southeast aligned street. At its signalized intersection with Diversey Parkway/North Broadway, Clark Street provides one through lane and one shared through/right-turn lane on its southeast approach and one exclusive right-turn lane and one through lane on its northwest approach. Left-turn movements from Clark street are prohibited at this intersection. On-street Paybox parking is generally provides on both sides of the street and a protected bike lane is also provided in both directions. Clark Street carries an ADT volume of 11,800 vehicles.

North Broadway is a northeast-to-southwest aligned street. At its signalized intersection with Diversey Parkway/Clark Street, North Broadway provides on shared through/right-turn lane on its northeast approach. Left-turn movements from North Broadway are prohibited at this intersection. On-street Paybox parking is generally provided on both sides of the street and North Broadway carries an ADT of 16,500 vehicles.

Pine Grove Avenue is a north-south aligned street that allows for two-way traffic south of Diversey Parkway and is restricted to one-way southbound traffic north of Diversey Parkway. At its signalized intersection with Diversey Parkway, Pine Grove Avenue provides one shared left-turn/through/right-turn lane on its north approach and one shared left-turn/right-turn lane on its south approach. Parking is generally provided on both sides of the street.

Surf Street is an east-west aligned street that is restricted to eastbound traffic. It provides one moving lane with unregulated parking permitted on both sides of the street. Surf Street is under stop sign control at its intersections with Cambridge Avenue and Pine Grove Avenue.

Hampden Court is generally a northwest-to-southeast street that extends between Diversey Parkway and Deming Place. It has one lane in each direction with parking or loading generally permitted on both sides of the street. Hampden Court is under stop sign control at its intersection with Diversey Parkway and all-way stop sign control at its intersection with Wrightwood Avenue. Crosswalks are provided along Hampden Court at its intersections with Diversey Parkway (continental style) and Wrightwood Avenue.

Cambridge Avenue is a one-way northbound street that extends from Diversey Parkway to Surf Street. It has one moving lane with parking generally permitted on both sides of the street. A crosswalk is provided on Cambridge Avenue at its intersection with Diversey Parkway.

East-West Alley runs parallel to Diversey Parkway and makes up the northern border of the site. The alley has a width of 16 feet that narrows due to utility poles, dumpsters and fire escapes that reduce the clear width of the alley. The alley provides access for parking as loading and refuse collection for the residential buildings that front Diversey Parkway, Pine Grove Avenue and Cambridge Avenue.

Alternative Modes of Transportation

Accessibility to and from the area is enhanced by the various alternative modes of transportation serving the area as summarized below.

Public Transportation. The area is served by Chicago Transit Authority CTA Brown and Purple Lines. A local stop for both lines is provided on Diversey Parkway just east of Sheffield Avenue approximately ½ mile west of the two parcels. The Belmont Avenue and Fullerton Avenue stations are located just north and south of the Diversey Parkway station and provide transfers to the Red Line. In addition, the following CTA bus routes serve the immediate area and all have stops within several blocks of the site. The alternative transportation options serving the area as summarized below and illustrated in **Figure 4**.

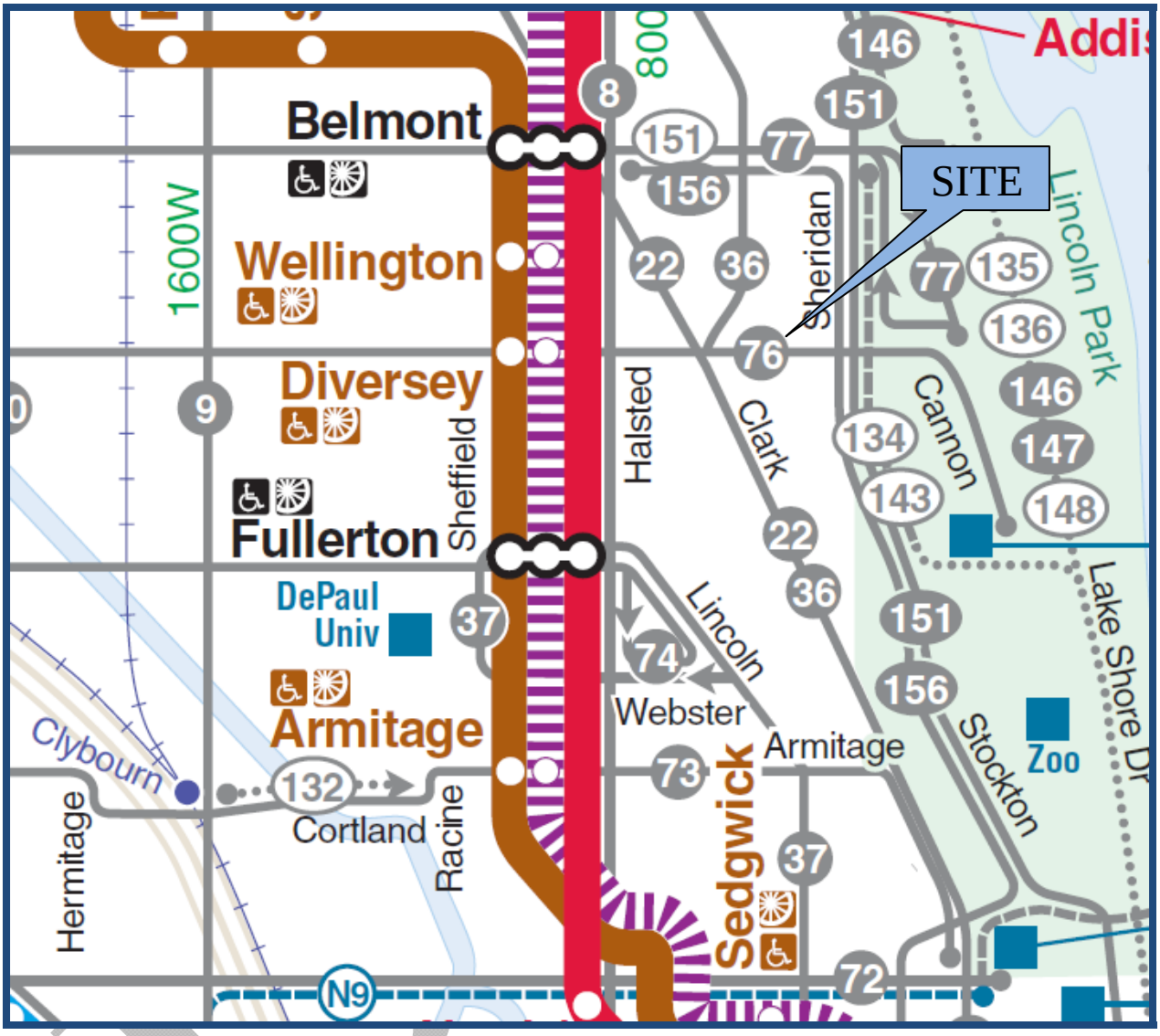
- Route Number 8 - Halsted
- Route Number 22 - Clark
- Route Number 36 - Broadway
- Route Number 76 - Diversey
- Route Number 134 - Stockton/LaSalle Express
- Route Number 143 - Stockton/Michigan Express
- Route Number 151 - Sheridan
- Route Number 156 - LaSalle

Bicycle Routes. The *Chicago's Streets for Cycling Plan 2020* identifies Clark Street as a Spoke Route and Halsted Street as a Crosstown Bike Route. Bike lanes are currently provided on both streets. Additionally, a Divvy bike sharing station is located on Hampden Court at its intersection with Diversey Parkway.

Pedestrian Facilities. All of the streets in the immediate area generally have sidewalks on both sides of the street. In addition, continental-style high visibility crosswalks and pedestrian countdown timers are provided at all area intersections except at the intersection of Diversey Parkway and Pine Grove Avenue, Surf Street and Pine Grove Avenue, Surf Street and Cambridge Avenue and the north leg of Cambridge Avenue and Diversey Parkway where regular crosswalks are provided.

Mode Sharing Facilities.

A Divvy bike sharing station is located on Hampden Court at its intersection with Diversey Parkway. Additionally, car sharing facilities are located at 600 West Diversey Parkway, 3114 North Broadway Street and 2836 North Clark Street, which provide access to six shared vehicles and are all within walking distance of the proposed site.



Area CTA System Map **Figure 4**

Existing Vehicle, Pedestrian and Bicycle Traffic Volumes

In order to determine current traffic, pedestrian and bicycle conditions near the proposed development and on the surrounding streets, KLOA, Inc. conducted peak period traffic, pedestrian and bicycle counts at the following intersections:

- Diversey Parkway with Sheridan Road/Lakeview Avenue/Cannon Drive (December 9, 2014)
- Diversey Parkway with Pine Grove Avenue (December 9, 2014)
- Surf Street with Cambridge Avenue (December 9, 2014)
- Surf Street with Pine Grove Avenue (December 9, 2014)
- East-West Alley with Cambridge Avenue (December 11, 2014)
- East-West Alley with Pine Grove Avenue (December 11, 2014)

The counts were conducted on during the morning (7:00 to 9:00 A.M.) and the evening (4:00 to 6:00 P.M.) peak periods Furthermore, traffic counts previously conducted in the area were utilized for the following intersections:

- Diversey Parkway with Hampden Court/Cambridge Avenue (September, 2014)
- Diversey Parkway with Clark Street/North Broadway (January, 2014)

The results of the traffic counts showed that the weekday morning peak hour of traffic occurs between 7:45 A.M. and 8:45 A.M. and the weekday evening peak hour of traffic occurs between 5:00 P.M. and 6:00 P.M., **Figure 5** illustrates the existing peak hour vehicular volumes. **Figure 6** illustrates the existing peak hour pedestrian and bicycle volumes.

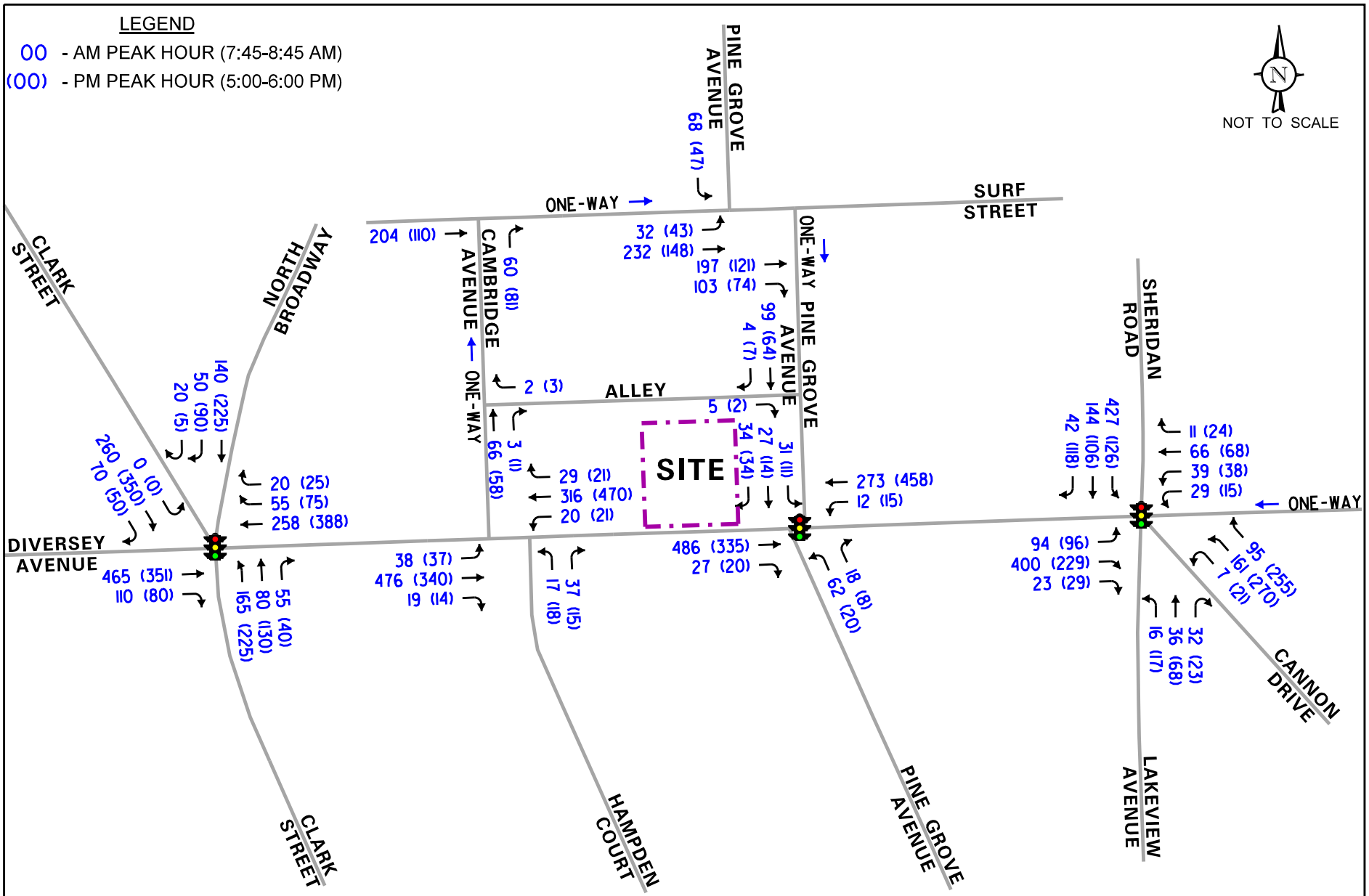
In addition, traffic counts were conducted at the parking lot currently occupying the site. The results of the counts indicated that low volume of traffic is currently generated by the parking lot during the peak hours.

Existing Traffic Observations

Traffic observations along Diversey Parkway were also conducted along with the traffic counts. The observations included the following:

- High volumes of pedestrian movements were observed at all area intersections.

- Traffic on the minor streets was observed to be light with no significant back-ups or queueing.



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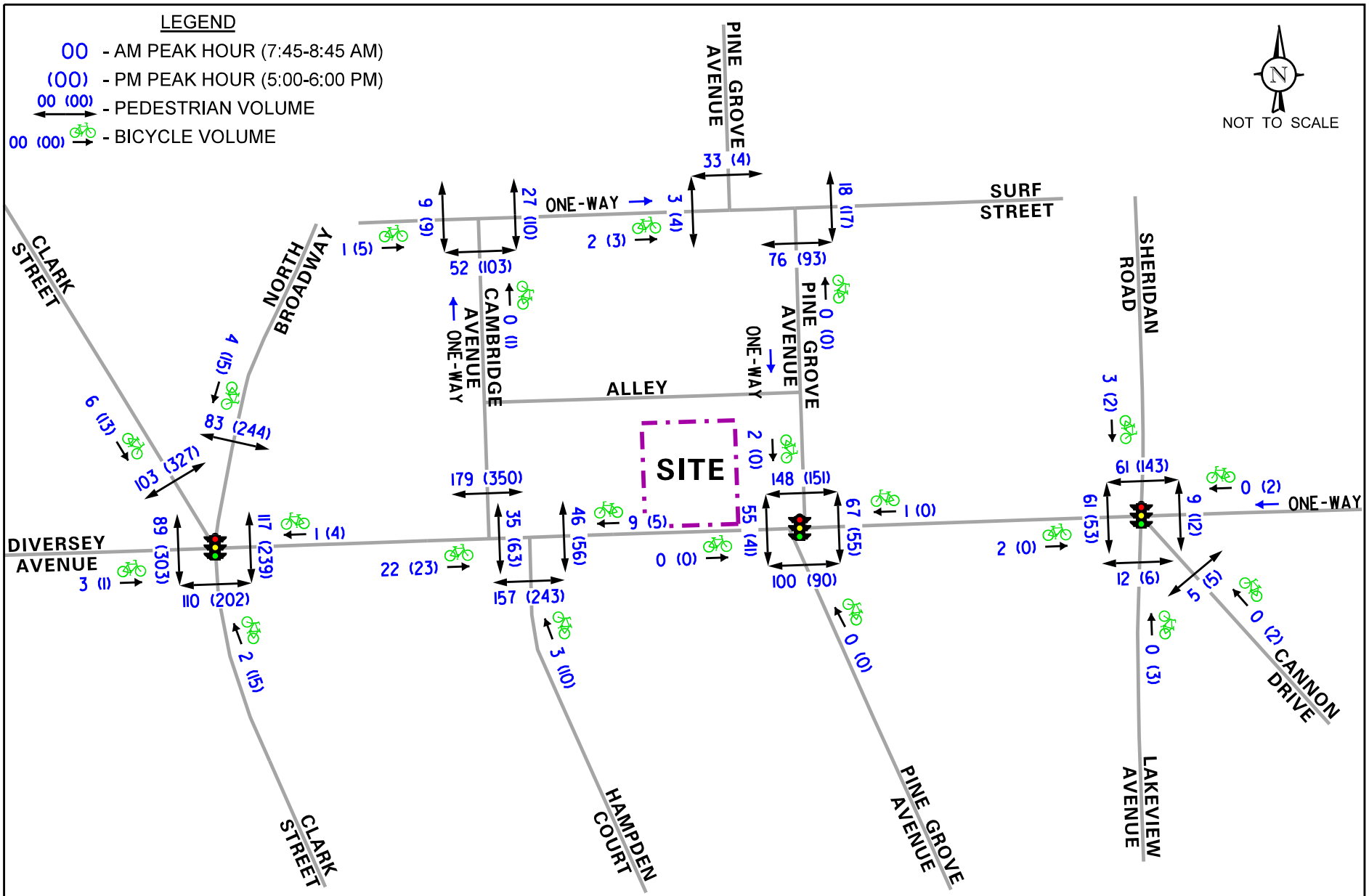
508 Diversey Mixed-Use Development Chicago, Illinois	Existing Traffic Volumes	KLOA Job No: 14-261 Figure: 5



PROJECT:	TITLE:	
508 Diversey Mixed-Use Development Chicago, Illinois	Existing Pedestrian and Bicycle Traffic Volumes	KLOA Job No: 14-261 Figure: 6

- Long Queues were observed on Diversey Parkway during the evening peak hour, especially in the westbound direction at its intersection with Clark Street and North Broadway. The queueing is primarily due to the pedestrian movements and the inability of traffic to make a right-turn onto Clark Street or North Broadway.

- The Left-turn movements from Cannon Drive at its intersection with Diversey Parkway were observed to queue past its storage length during the evening peak hour.

- The alley was observed to carry low volume of traffic and no traffic was observed to stop or idle in the alley.

- Two single unit trucks were observed to utilize the alley. One during the morning peak hour and one during the evening peak hour. Neither truck was observed to stop or park in the alley during the observations.

3.
Traffic Characteristics of the Development

To evaluate the impact of the subject development on the area street system, it was necessary to quantify the number of vehicle trips the development will generate during the weekday morning and weekday evening peak hours and then determine the directions from which this traffic will approach and depart the development.

Site Location

The site of the development is located on the north side of Diversey Parkway, between Cambridge Avenue and Pine Grove Avenue within an urban neighborhood area and is currently occupied by a 20-space surface parking lot and a three story structure containing the Yak-Zies Bar and Grill. Area land uses are predominantly retail and commercial spaces along Diversey Parkway with residential uses to the north along Cambridge Avenue, Surf Street and Pine Grove Avenue.

Proposed Development Plan

The plans call for a 12-story apartment building with 52 units and approximately 3,100 square feet of ground floor retail. The three-story structure will remain. A total of 53 parking spaces are to be provided in a parking garage located on the second and third floors for residents of the building.

Development Access

Access to the parking garage serving the apartment building will be provided on the east-west alley that runs along the northern border of the site and connects to Pine Grove Avenue and Cambridge Avenue to the east and west, respectively. The access drive will provide one inbound lane and one outbound lane with the outbound movements under stop sign control. In addition, the access drive should be equipped with appropriate safety devices (visual and/or audio). It is important to note that no vehicle access will be provided on Diversey Parkway which is classified as a Pedestrian Street.

Loading for the apartment building and retail space will be provided via a loading dock located off the east-west alley along the northern border of the site and will require trucks to back into the loading dock. Truck turning diagrams for the proposed development are shown in **Exhibit A and B** located in the Appendix.

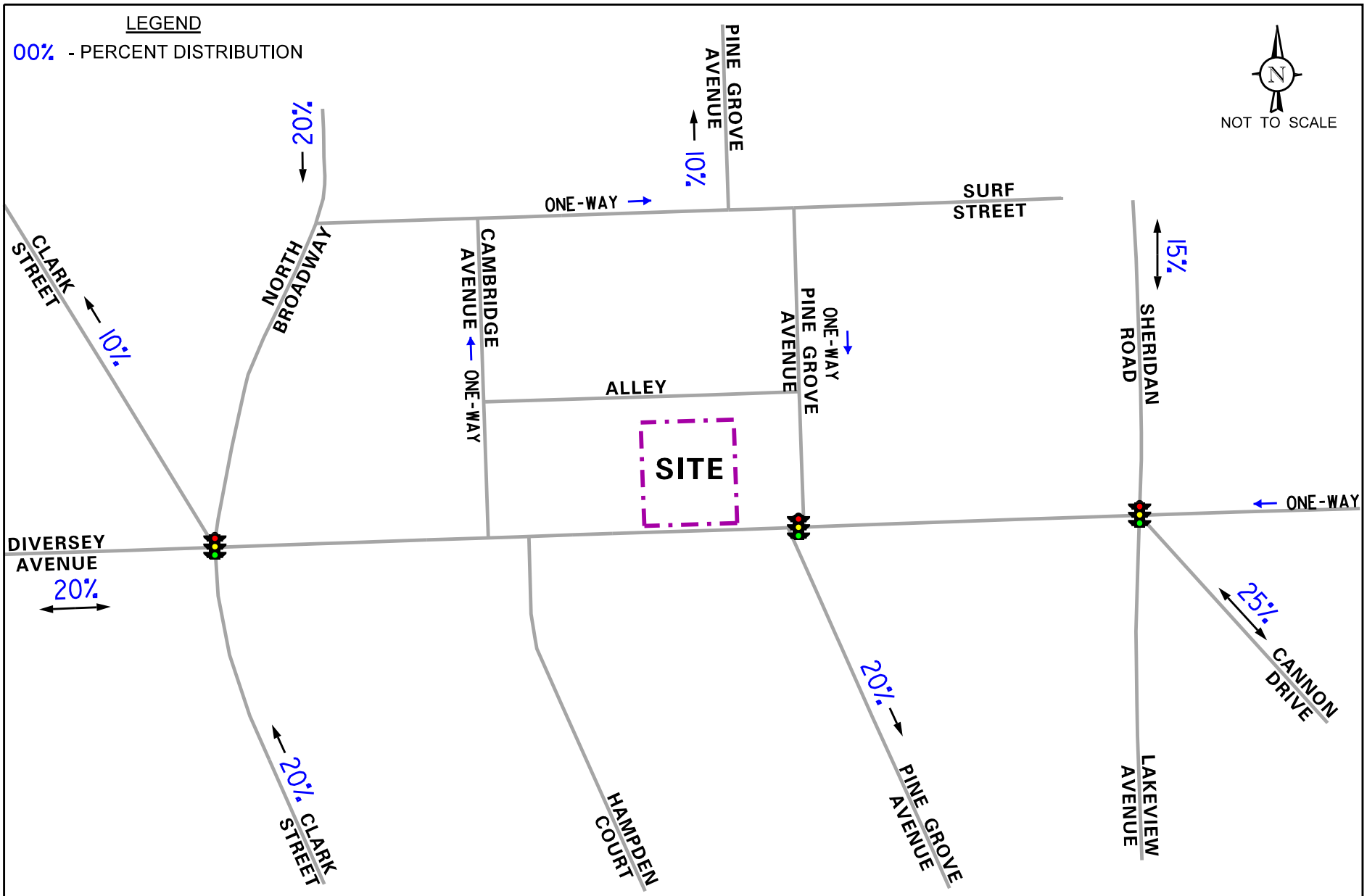
Directional Distribution of Development Traffic

The directional distribution of development-generated trips on the external streets is based on existing travel patterns, one-way restrictions on adjoining street network and turn restrictions at the signalized intersection of Diversey Parkway with Clark Street and North Broadway. **Figure 7** illustrates the directional distribution of traffic.

Development Traffic Generation

The number of peak hour vehicle trips estimated to be generated by the proposed development was based on vehicle trip generation rates contained in *Trip Generation Manual*, 9th Edition, published by the Institute of Transportation Engineers (ITE). The Apartment (Land-Use Code 220) and Specialty Retail Center (Land-Use Code 826) rates were used for the study.

However, the ITE rates are based on suburban developments where the primary mode of transportation is the automobile. As indicated previously, the parcel is located within a dense urban neighborhood that contains a large population of people who live and work within walking distance of the site. Further, the CTA's Diversey Parkway station is located approximately ½ mile west of the site and several CTA bus lines serve the area. In addition, a Divvy bike sharing station is located adjacent to the north parcel on Hampden Court and car sharing facilities are located at 600 West Diversey Parkway, 3114 North Broadway Street and 2836 North Clark Street. As such, the number of vehicle trips to be generated by the development will be reduced due to these factors. Based on census data (included in the Appendix) and previous studies conducted in the area, the estimated traffic to be generated by the residential uses were reduced by 70 percent and the traffic to be generated by the commercial space was reduced by 50 percent.
Table 1 shows the estimated number of peak hour trips to be generated by the proposed development.



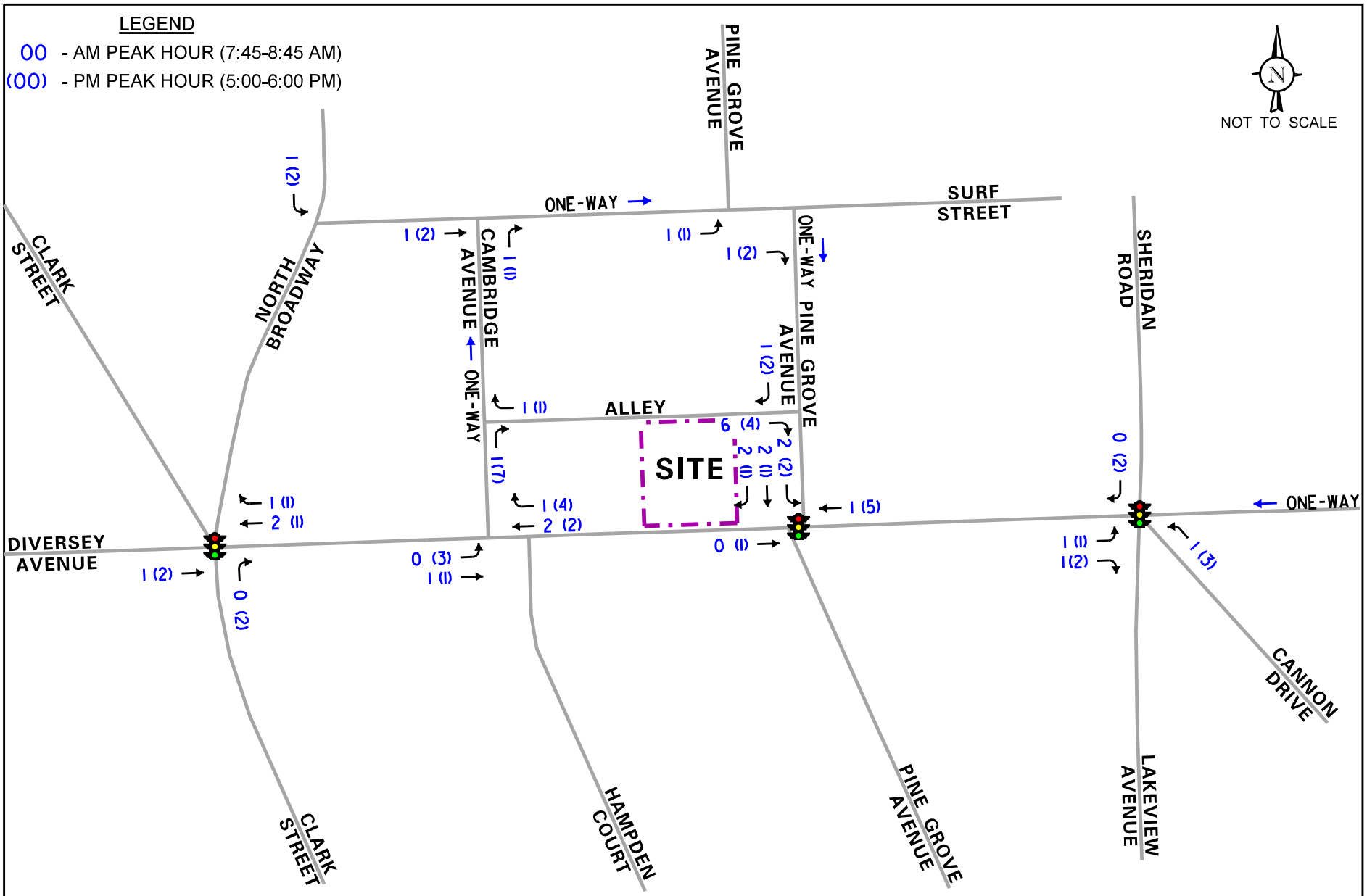
PROJECT:	TITLE:	
508 Diversey Mixed-Use Development Chicago, Illinois	Estimated Directional Distribution	KLOA Job No: 14-261 Figure: 7

Table 1
ESTIMATED DEVELOPMENT-GENERATED TRAFFIC VOLUMES

ITE Land-Use Code	Type/Size	Weekday A.M. Peak Hour In	Out	Total	Weekday P.M. Peak Hour In	Out	Total
Apartments							
220	52 Units	6	23	29	30	16	46
	Less Reduction (70%)	-4	-16	-20	-21	-11	-32
	Subtotal Trips	2	7	9	9	5	14
Commercial Space							
820	3,100 s.f.	1	1	2	4	5	9
	Less Reduction (50%):	-0	-0	-0	-2	-3	-5
	Subtotal Trips	1	1	2	2	2	4
	Total New Development Trips:	**3**	**8**	**11**	**11**	**7**	**18**

Development Traffic Assignment

The peak-hour traffic volumes projected to be generated by the proposed development (refer to Table 1) were assigned to the street system based on the previously established directional distribution analysis. **Figure 8** shows the assignment of the development-generated peak hour traffic volumes.



PROJECT:	TITLE:	
508 Diversey Mixed-Use Development Chicago, Illinois	Estimated Site-Generated Traffic Volumes	KLOA Job No: 14-261 Figure: 8

4.
Total Projected Traffic Conditions

The total projected traffic volumes include the existing traffic volumes, traffic estimated to be generated by background developments in the area and the traffic estimated to be generated by the proposed subject development.

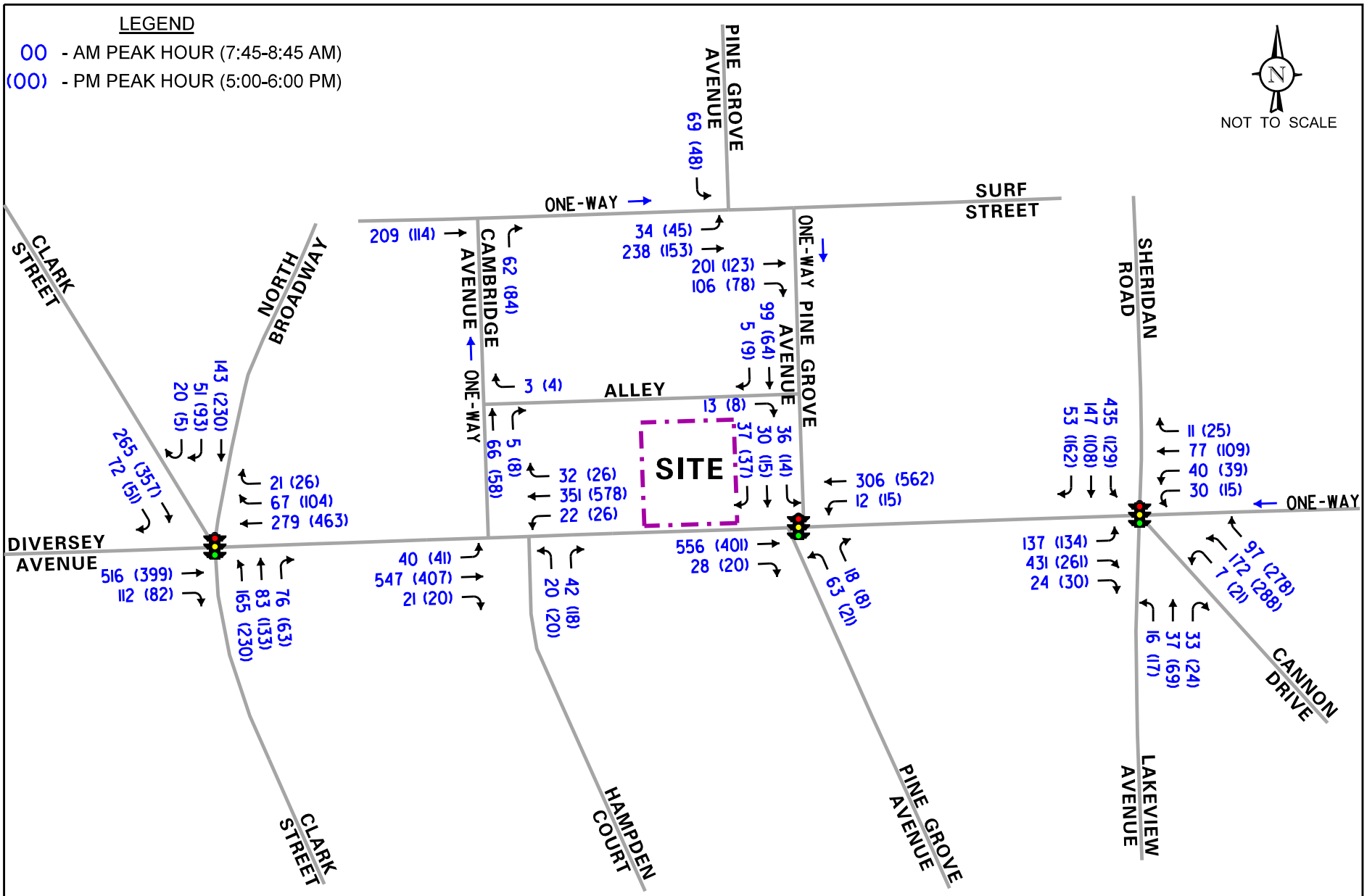
Background Development Traffic

When projecting future traffic conditions, the traffic from the following developments that were proposed/planned at the time the traffic study was conducted was generated and added to the area intersections:

- The 3030 Broadway Development
- Proposed Condominium Development at 601 W Diversey Parkway
- Saint Joseph Hospital Medical Office Building
- The Redevelopment of the Inn at Lincoln Park

Total Projected Traffic Conditions

The total projected traffic volumes include the existing traffic volumes increased by a regional growth factor of two percent, traffic that will be generated by the full buildout of the four proposed/planned developments noted above estimated to traverse on the adjacent street network of this proposed development and the traffic that will be generated by the proposed subject development (refer to Table 1 and Figure 8). **Figure 9** shows the total projected traffic volumes.



PROJECT:	TITLE:	
508 Diversey Mixed-Use Development Chicago, Illinois	Total Projected Traffic Volumes	KLOA Job No: 14-261 Figure: 9

5.
Traffic Analysis and Recommendations

Traffic capacity analyses were performed to determine the operation of the existing street system, evaluate the impact of the proposed development plan and determine the ability of the existing street system to accommodate projected traffic demands. Analyses were performed for the weekday morning and evening peak hours for the existing traffic volumes, the existing plus development-generated traffic volumes and the total projected traffic volumes upon development of the parcels.

The traffic analyses were performed using the methodologies outlined in the Transportation Research Board's *Highway Capacity Manual (HCM), 2010* and modeled/analyzed using the Synchro/SimTraffic 8 software.

The analyses for the unsignalized intersections determine the average control delay to vehicles at an intersection. The methodology analyzes each intersection approach controlled by a stop sign and considers traffic volumes on all approaches and lane characteristics.

The ability of an intersection to accommodate traffic flow is expressed in terms of level of service, which is assigned a letter grade from A to F based on the average control delay experienced by vehicles passing through the intersection. Control delay is that portion of the total delay attributed to the traffic signal or stop sign control operation and includes initial deceleration delay, queue move-up time, stopped delay and final acceleration delay. Level of Service A is the highest grade (best traffic flow and least delay), Level of Service E represents saturated or at-capacity conditions and Level of Service F is the lowest grade (oversaturated conditions, extensive delays).

The *Highway Capacity Manual* definitions for levels of service and the corresponding control delay for both signalized and unsignalized intersections are shown in **Table 2**. Summaries of the results of the capacity analyses experienced in terms of level of service and average delays are presented in **Tables 3 and 4** for existing and future conditions, respectively. Summaries of the resulting queues at the signalized intersection within the study area are summarized in **Tables 5 and 6** for existing and future conditions, respectively. A discussion of the findings and recommendations follows.

Table 2
LEVEL OF SERVICE CRITERIA

Signalized Intersections

Level of Service	Interpretation	Average Control Delay (seconds per vehicle)
A	Favorable progression. Most vehicles arrive during the green indication and travel through the intersection without stopping.	≤10
B	Good progression, with more vehicles stopping than for Level of Service A.	>10 - 20
C	Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear. Number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.	>20 - 35
D	The volume-to-capacity ratio is high and either progression is ineffective or the cycle length is too long. Many vehicles stop and individual cycle failures are noticeable.	>35 - 55
E	Progression is unfavorable. The volume-to-capacity ratio is high and the cycle length is long. Individual cycle failures are frequent.	>55 - 80
F	The volume-to-capacity ratio is very high, progression is very poor and the cycle length is long. Most cycles fail to clear the queue.	>80.0

Unsignalized Intersections

Level of Service	Average Total Delay (SEC/VEH)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

Source: *Highway Capacity Manual*, 2010.

Table 3
CAPACITY ANALYSIS RESULTS - EXISTING CONDITIONS

Intersection	Weekday A.M. Peak Hour LOS	Weekday A.M. Peak Hour Delay	Weekday P.M. Peak Hour LOS	Weekday P.M. Peak Hour Delay
Diversey Parkway with Clark Street/North Broadway				
Overall	D	45.3	D	47.8
Eastbound Approach	E	63.8	D	44.0
Westbound Approach	D	42.9	E	62.7
Northbound Approach	C	24.5	C	27.9
Southbound Approach (Clark Street)	C	38.6	D	54.6
Southwest-bound Approach (North Broadway)	D	37.7	D	46.0
Diversey Parkway with Hampden Court/Cambridge Avenue				
Northbound Approach	C	23.3	C	21.0
Eastbound Approach				
Diversey Parkway with Pine Grove Avenue				
Overall	B	13.1	B	19.4
Eastbound Approach	A	7.3	C	22.3
Westbound Approach	B	10.9	B	14.8
Northbound Approach	C	34.1	C	30.8
Southbound Approach	C	33.8	C	31.9
Diversey Parkway with Sheridan Road/Lakeview Avenue/Cannon Drive				
Overall	D	44.1	D	37.8
Eastbound Approach	D	43.9	D	37.5
Westbound Approach	C	32.5	C	32.4
Northbound Approach	D	40.3	D	46.8
Southbound Approach	C	31.4	C	30.3
Northwest-bound Approach (Cannon Drive)	F	84.3	D	50.9
Surf Street with Cambridge Avenue				
Overall	A	8.1	A	7.4
Surf Street with Pine Grove Avenue				
Overall	A	9.0	A	8.3
Cambridge Avenue with Alley				
Westbound Approach	A	8.6	A	8.6
Pine Grove Avenue with Alley				
Eastbound Approach	A	8.8	A	8.6

LOS = Level of Service
Delay is measured in seconds.

Table 4
CAPACITY ANALYSES RESULTS - TOTAL PROJECTED CONDITIONS

Intersection	Weekday A.M. Peak Hour LOS	Weekday A.M. Peak Hour Delay	Weekday P.M. Peak Hour LOS	Weekday P.M. Peak Hour Delay
Diversey Parkway with Clark Street/North Broadway				
Overall	D (D)	54.4 (36.7)	D (D)	54.9 (44.8)
Eastbound Approach	F (D)	88.8 (37.4)	D (C)	48.5 (31.2)
Westbound Approach	D (C)	46.1 (27.8)	F (D)	87.8 (43.5)
Northbound Approach	C (C)	24.4 (29.6)	C (C)	27.1 (33.1)
Southbound Approach (Clark Street)	D (D)	39.4 (47.2)	D (E)	51.6 (67.3)
Southwest-bound Approach (North Broadway)	D (D)	37.9 (44.2)	D (D)	45.0 (54.1)
Diversey Parkway with Hampden Court/Cambridge Avenue				
Northbound Approach	D	29.9	C	23.9
Eastbound Approach				
Diversey Parkway with Pine Grove Avenue				
Overall	B	14.9	B	19.2
Eastbound Approach	B	14.3	B	11.1
Westbound Approach	B	11.5	C	22.9
Northbound Approach	C	34.3	C	30.8
Southbound Approach	C	34.5	C	32.2
Diversey Parkway with Sheridan Road/Lakeview Avenue/Cannon Drive				
Overall	D (D)	47.1 (39.6)	F (D)	97.2 (36.5)
Eastbound Approach	D (D)	51.7 (41.2)	D (D)	43.6 (47.6)
Westbound Approach	C (C)	32.7 (32.7)	C (C)	33.2 (35.0)
Northbound Approach	D (D)	40.6 (43.0)	D (D)	42.4 (46.9)
Southbound Approach	C (C)	31.4 (32.8)	C (C)	23.7 (31.3)
Northwest-bound Approach (Cannon Drive)	F (E)	90.9 (56.0)	F (D)	227.7 (44.2)
Surf Street with Cambridge Avenue				
Overall	A	8.2	A	7.4
Surf Street with Pine Grove Avenue				
Overall	A	9.1	A	8.3
Cambridge Avenue with Alley				
Westbound Approach	A	8.6	A	8.6
Pine Grove Avenue with Alley				
Eastbound Approach	A	8.8	A	8.7

LOS = Level of Service
Delay is measured in seconds.
( ) - Assumes signal timing improvements as discussed in the report.

Table 5
95TH PERCENTILE QUEUES - EXISTING VOLUMES

Intersection	Peak Hour	Operating Conditions by Approach														
		Eastbound			Westbound			Northbound			Southbound			Broadway		
		L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
Diversey with Clark and North Broadway	*Wkdy AM*	--	553	120	--	273	86	--	161	80	--	258	83	--	147	087
	Wkdy PM	--	356	91	--	422	181	--	224	95	--	402	67	--	238	119
		Eastbound			Westbound			Northbound			Southbound					
Diversey and Pine Grove	*Wkdy AM*	--	21	--	--	132	--	--	91	--	--	101	--			
	Wkdy PM	--	351	--	--	320	--	--	41	--	--	76	--			
		Eastbound			Westbound			Northbound			Southbound			Cannon		
Diversey with Sheridan/Cannon/ Lakeview	*Wkdy AM*	105	--	423	75	74	20	--	100	--	191	121	--	268	--	43
	Wkdy PM	113	--	185	67	79	37	--	135	--	71	192	--	391	--	102
Queue length measured in feet.																

Table 6
95TH PERCENTILE QUEUES – PROJECTED VOLUMES

Intersection	Peak Hour	Operating Conditions by Approach														
		Eastbound			Westbound			Northbound			Southbound			Broadway		
		L	T	R	L	T	R	L	T	R	L	T	R	L	T	R
Diversey with Clark and North Broadway[1]	*Wkdy AM*	--	628 (499)	117 (109)	--	297 (236)	104 (89)	--	167 (187)	94 (114)	--	259 (288)	83 (94)	--	151 (166)	88 (97)
	Wkdy PM	--	443 (359)	92 (84)	--	545 (432)	239 (173)	--	226 (252)	109 (134)	--	405 (464)	70 (76)	--	240 (270)	121 (134)
		Eastbound			Westbound			Northbound			Southbound					
Diversey and Pine Grove	*Wkdy AM*	--	254 (325)	--	--	149 (149)	--	--	92 (92)	--	--	112 (112)	--			
	Wkdy PM	--	369 (207)	--	--	320 (320)	--	--	41 (41)	--	--	76 (76)	--			
		Eastbound			Westbound			Northbound			Southbound			Cannon		
Diversey with Sheridan/ Cannon/ Lakeview[1,2]	*Wkdy AM*	148 (148)	--	391 (436)	80 (80)	84 (84)	20 (20)	--	104 (107)	--	194 (196)	130 (138)	--	279 (245)	--	44 (43)
	Wkdy PM	158 (163)	--	253 (210)	67 (69)	116 (119)	38 (39)	--	131 (136)	--	65 (72)	195 (234)	--	509 (371)	--	116 (106

Queue length measured in feet.
( ) Assumes signal timing improvements as discussed in the report

Discussion and Recommendations

Traffic capacity analyses were conducted for existing conditions and the future projected condition, which considers the proposed development, four nearby planned developments and an increase in existing traffic due to regional growth in the area. The following recommendations and improvements for each analyzed intersection follows.

Diversey Parkway with Clark Street and North Broadway

The results of the capacity analyses indicate that while overall this intersection is currently operating at Level of Service (LOS) D during the morning and evening peak hours, delays and queueing are occurring by some individual movements particularly along Diversey Parkway. These can be attributed to the inefficiency of the five-legged intersections which reduces the available green time for each approach and the high pedestrian volumes entering the intersection. Under future conditions that also include the traffic from other developments as well as background growth, the intersection's delays and queues increasing on Diversey Parkway will increase. While the proposed development will contribute less than one percent to the total traffic and that the four developments combined will contribute less than one percent to the total traffic, consideration should be given to the following improvements:

- Increase the intersection's cycle length by ten seconds.

- Adjust the signal timings to provide an eastbound and westbound protected lag phase which will allow for the right-turning movements to occur without conflict with pedestrians.

When the intersection was reanalyzed with the recommended improvements, the overall level of service will improve to D and the overall delays the intersection currently experiences will be reduced. Furthermore, the provision of lag phases on both approaches of Diversey Parkway will reduce the vehicular queues on both approaches and improve the eastbound and westbound approaches level of service during the morning and evening peak hours to level of service D or better. These signal timing improvements can be accommodated while still maintaining adequate time to allow pedestrians to cross Clark Street and North Broadway.

Diversey Parkway with Cambridge Avenue/Hampden Court

The results of the capacity analyses and field observations have shown that the eastbound approach, particularly the left turning movements onto Cambridge Avenue currently operate at acceptable levels of service and will continue to do so in the future with the development generated traffic. As such, no capacity improvements will be necessary in conjunction with the proposed development.

Diversey Parkway with Pine Grove Avenue

The results of the capacity analysis indicate that this intersection is currently operating at a good level of service during both the morning and evening peak hours and is projected to continue to do so in the future condition with the majority of site traffic utilizing this intersection to egress from the site. As such, no capacity improvements are necessary at this intersection. To improve pedestrian safety, the cross walks on all legs should be restriped to high visibility continental style.

Diversey Parkway with Sheridan Road/Cannon Drive/Lakeview Avenue

The results of the capacity analyses indicate that this intersection is currently operating at Level of Service D during both the morning and evening peak hours but will drop to Level of Service E during the morning peak hour under future conditions. This is primarily due to the delays experienced by the Cannon Drive leg of the intersections which receives minimal green time due to the inefficiency of the five-legged intersections as well as the left-turning movements from Cannon Drive onto Lakeview Avenue which should not be permitted as they are in conflict with the right turns from Diversey Parkway onto Lakeview Avenue. As such, while the proposed development will contribute less than one percent to the total traffic, consideration should be given to the following improvements:

- Prohibit, via signage, the left-turn movements from Cannon Drive onto Lakeview Avenue.

- Adjust the signal timings to provide additional green time to Cannon Drive.

When the intersection was reanalyzed with the recommended improvements, the overall level of service will improve to D resulting in lowering the overall delay the intersection currently experiences. Furthermore, the Cannon Drive approach will improve to level of service E during the morning peak hour and the queues will be further reduced. No additional improvements will be necessary to accommodate future traffic volumes.

Surf Street with Cambridge Avenue and Pine Grove Avenue

The results of the capacity analyses indicate that these intersections are currently operating at acceptable levels of service and will continue to do so in the projected condition. This is due to the one-way eastbound traffic restriction on Surf Street and the limited traffic volume at the intersections in the existing and future condition. As such, no capacity or geometric improvements are necessary at this intersection. However, consideration should be given for provision of continental-style crosswalks at both intersections to improve pedestrian safety.

East-West Alley with Cambridge Avenue and Pine Grove Avenue

The results of the capacity analyses indicate that the intersections of the alley and Cambridge Avenue and Pine Grove Avenue will both operate at acceptable levels of service in the existing as well as the future condition. Further inspection of the capacity analyses and the simulation runs indicate that the northbound queue on Cambridge Avenue and the southbound queues on Pine Grove Avenue will not extend to the alley and as such will not have an impact on the operations of the alley.

6.
Conclusion

Based on the preceding analyses and recommendations, the following conclusions have been made.

- The volume of vehicle trips generated by the proposed development will be reduced due to the following.
    - ❖ The dense, urban nature of the neighborhood that contains a large population of people who live and work within walking distance of the site.
    - ❖ The public transportation and non-motorized transportation serving the area.
    - ❖ Proximity to Divvy bike and car sharing facilities.
- The development-generated traffic can be accommodated without significant impact to the external street system.
- Access to the parking garage for the apartment building will be provided via a single access drive on the east-west alley that runs along the north property line.
- The proposed access system will be adequate to serve the traffic that will be generated by the proposed development with minimal impact on the operation of the alley or area intersections.
- The elimination of the existing access drive that serves the parking lot on site on Diversey Parkway will improve pedestrian safety and traffic flow.
- The following summarizes measures to be implemented by the development and/or recommendations to further minimize the impact of the development, foster alternative modes of transportation other than the automobile and to enhance pedestrian/bicycle safety.
    - ❖ Continental style crosswalks should be installed at the area intersections which currently do not have them including Diversey Parkway with Pine Grove Avenue and on Cambridge Avenue at its intersection with Diversey Parkway.
    - ❖ Bike racks should be provided as part of the development.

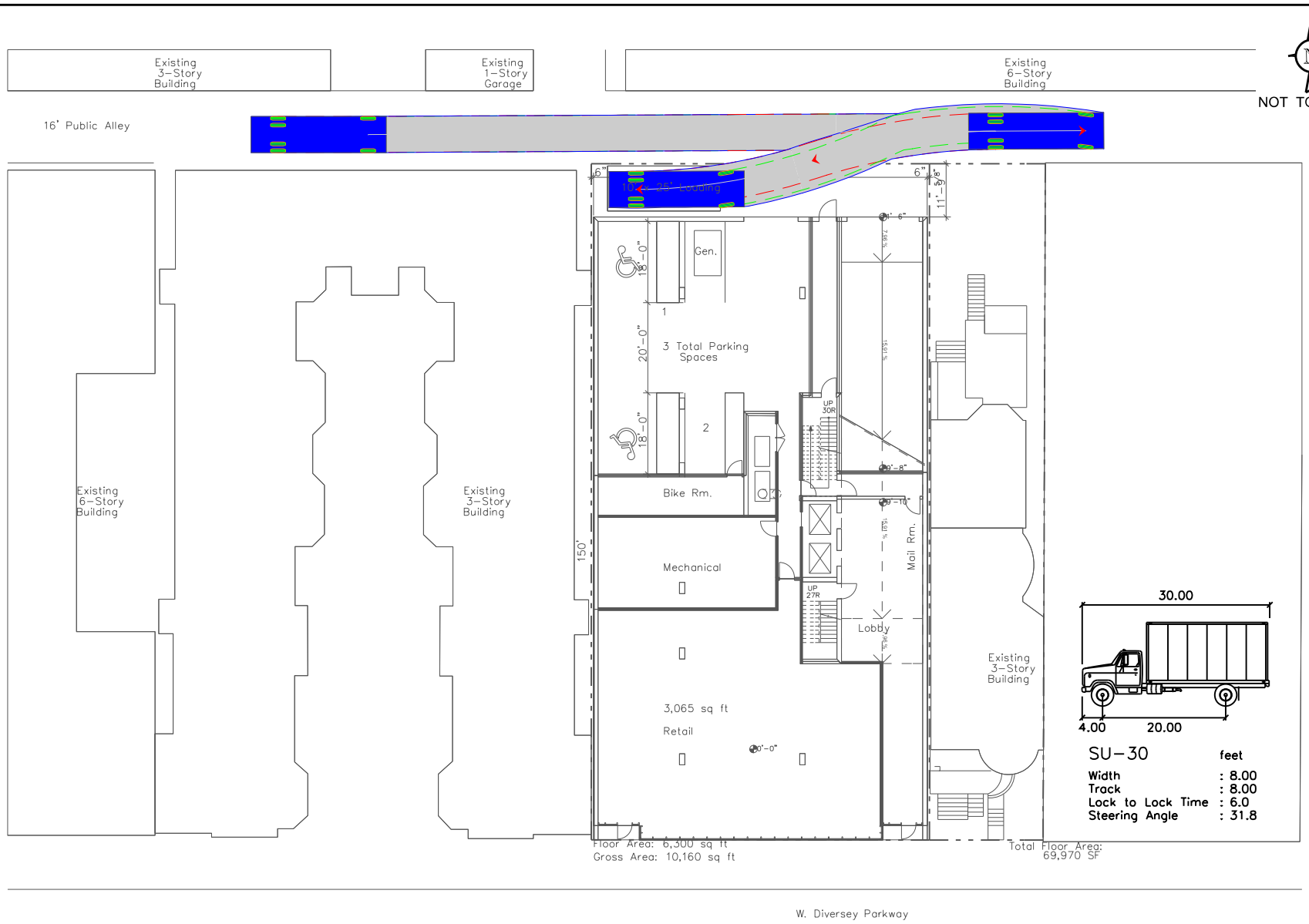
- ❖ Consideration should be given to modifying the traffic signal at the intersection of Diversey Parkway with Clark Street and North Broadway to allow for an increase in the cycle length and to provide a protected lag phase for Diversey Parkway traffic.

- ❖ Left-turn movements from Cannon Drive into Lakeview Avenue should be prohibited via signage.

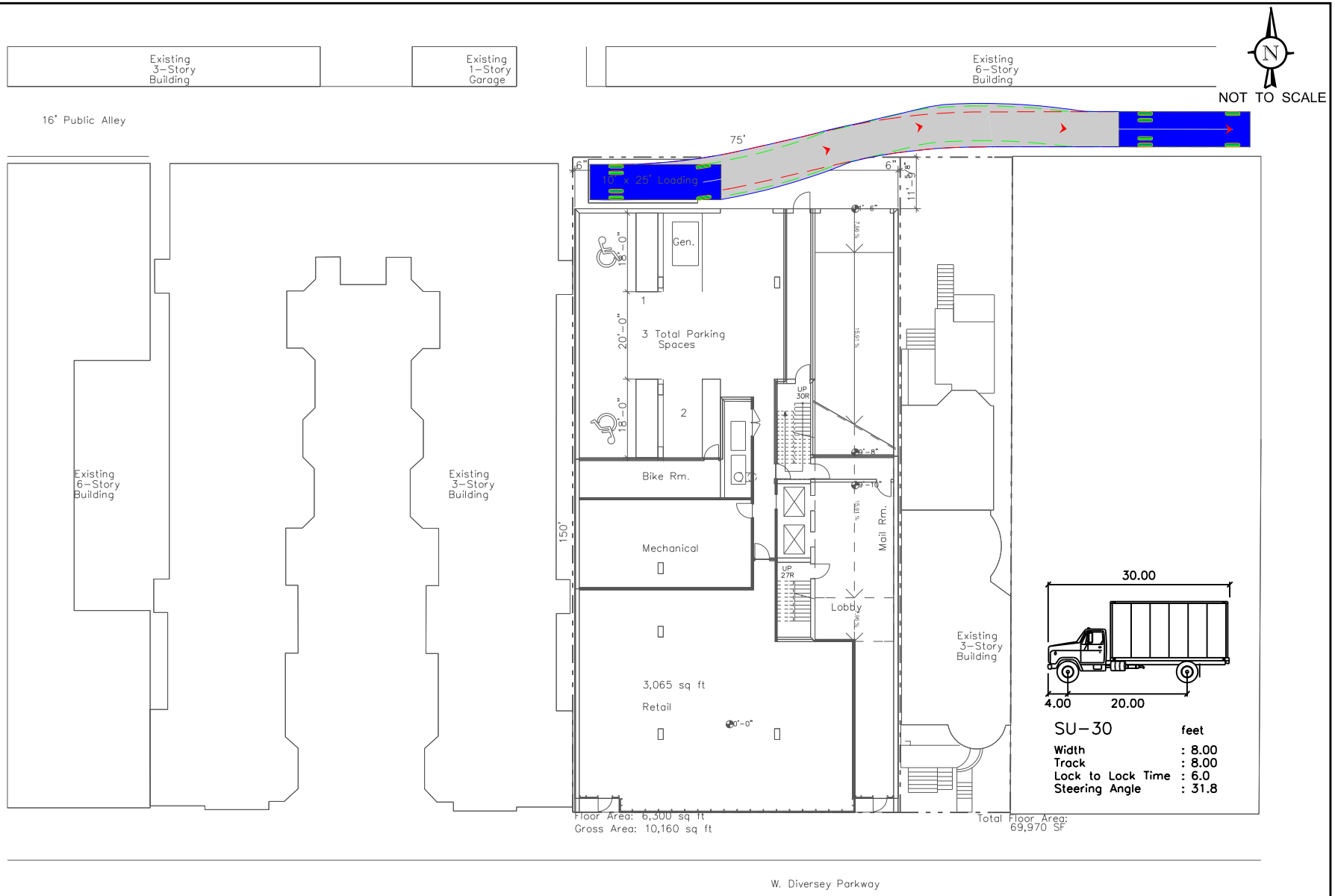
- ❖ Consideration should be given to allocating additional green time to Cannon Drive at its intersection with Diversey Parkway/Lakeview Avenue.

Appendix

- **Auto Turn Runs**



PROJECT:	TITLE:	
Mixed-Use Development Chicago, Illinois	Single-Unit Truck Inbound Maneuver	KLOA Job No: 14-261 Figure: A



PROJECT:	TITLE:	
Mixed-Use Development Chicago, Illinois	Single-Unit Truck Outbound Maneuver	KLOA Job No: 14-261 Figure: B