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Memorandum

To: Mike Mertens
Assistant Village Manager
Village of Tinley Park

From: Will Van Dyke
Michelle Meyer

Date: March 10, 2005

Subject: Additional Traffic Counts and Analysis
Village of Tinley Park, Illinois

Introduction

Kimley-Horn and Associates, Inc., has prepared this memorandum at the request of the Village of Tinley Park to respond to several questions raised about the traffic count times and the proposed eastward extension of 175th Street to Hickory Street recommended in the downtown parking and traffic study prepared by our firm. Specifically, questions were raised about the times of the peak traffic on Oak Park Avenue, and whether other times of the day, or even on weekends, might have heavier traffic than the morning and afternoon times included in our study. We have also considered whether a traffic signal at 179th Street and Oak Park Avenue would have any advantages as a connection to Harlem Avenue over the one currently proposed between 175th Street and Harlem via Hickory Street.

Summary and Conclusions

Friday and Saturday Traffic Counts at 175th/Oak Park

- The Friday traffic volumes from 2:00 to 4:00 PM were similar to the weekday peak-hour volumes from 4:00 to 6:00 PM.
- The Saturday traffic volumes from 11:00 AM to 1:00 PM were similar to the weekday peak-hour volumes.

Peak Hour Traffic Counts

- *179th/Oak Park Avenue.* The peak-hour counts were somewhat lower than the volumes farther north on Oak Park. The peak hour on 179th Street was considerably lower than on 175th Street.

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- *179th/Harlem.* Most of the traffic enters 179th from the north in a dedicated left-turn lane and exits north to Harlem making a right turn.
- *Hickory/Harlem.* Traffic flow at this location is similar to 179th and Harlem, with most traffic accessing Hickory from the north at a dedicated left-turn lane and making a right turn to access Harlem from westbound Hickory. The traffic on the west leg accessing the State of Illinois Mental Health facility is split nearly evenly between north and south on Harlem.

Accident Data

- The accident data for the intersections of 179th Street and Harlem and Hickory and Harlem do not indicate any significant number of accidents as a result of traffic entering or exiting from the two east-west streets. Many of the accidents at these locations are on Harlem, unrelated to the intersection.

24-Hour Tube Count Data

- The 24-hour tube counts on Oak Park Avenue north of 175th Street indicate the following:
  - The overall peak time on a weekday was from 4:00 to 5:00 PM
  - The traffic is consistently above 1,300 vehicles per hour from 2:00 to 6:00 PM
  - The peak weekday traffic volume occurs on Friday
  - Saturday is the busiest day of the week
  - Sunday is the least busiest day of the week

Potential Traffic Signal at 179th /Oak Park Avenue

- The 179th/Oak Park Avenue intersection does not meet the peak-hour traffic signal warrant. Based on projected traffic, a signal is not warranted.

175th Street Extension to Hickory Street

- The recommendation to extend 175th Street west to Hickory has not changed based on considering 179th Street as an alternative for the following reasons:
  - Hickory Street is wider and more improved at Harlem than 179th Street.
  - There are no indications of a significant safety concern at Hickory, and the 179th location actually has had more accidents in the past four years.
  - Making a four-legged intersection at 175th Street has clear benefits for drivers making a left turn at Oak Park Avenue either entering or leaving the downtown area.

Intersection Traffic Counts and Analysis

Traffic Counts and Existing Traffic Volumes

We conducted intersection traffic counts at the intersection of Oak Park Avenue and 175th Street on a Friday from 2:00 to 4:00 PM and again on a Saturday from 11:00 AM until 1:00 PM. We also conducted peak-hour traffic counts at three intersections not included in the original study area, as follows:

- 179th Street and Oak Park Avenue
- 179th Street and Harlem Avenue
- Hickory Street and Harlem Avenue

The morning peak-hour traffic counts were conducted from 7:00 to 9:00 AM, and the afternoon counts from 4:00 to 6:00 PM, the same as for the downtown traffic study. In addition, we conducted a field visit to collect roadway geometry information, note general traffic conditions, and observe the operating conditions in the vicinity of the three intersections listed above. The existing traffic volumes are shown in Figure 1, and the existing traffic control and lane configurations are shown in Figure 2. All of the intersections are currently controlled with stop signs for the streets intersecting Oak Park Avenue and Harlem Avenue. The traffic count data is summarized in Figure 3. Following is a summary of the findings for each intersection.

175th/Oak Park Avenue—Friday, 2:00 to 4:00 PM

The Friday early afternoon peak traffic volumes at this intersection were similar to the peak hour volumes from 4:00 to 6:00 PM. This data and the data from the 24-hour tube counts suggest that traffic volumes at this location remain at relatively constant levels from early afternoon until the late afternoon and that after 6:00 PM they decrease considerably.

175th/Oak Park Avenue—Saturday, 11:00 AM to 1:00 PM

The Saturday traffic volumes at this intersection were similar to the peak-hour weekday volumes. This data and the data from the 24-hour tube counts suggest that midday Saturday traffic volumes on Oak Park Avenue and on 175th Street are comparable to weekday peak-hour volumes.

179th /Oak Park Avenue—Weekday, 7:00 to 9:00 AM and 4:00 to 6:00 PM

The peak-hour volumes on Oak Park Avenue were somewhat lower than the volumes farther north on Oak Park. The peak-hour traffic volume on 179th Street was considerably lower than the comparable volume on 175th Street, with about 60 westbound vehicles in the afternoon peak hour on the east approach at 179th Street, compared with almost 200 westbound vehicles at 175th Street.

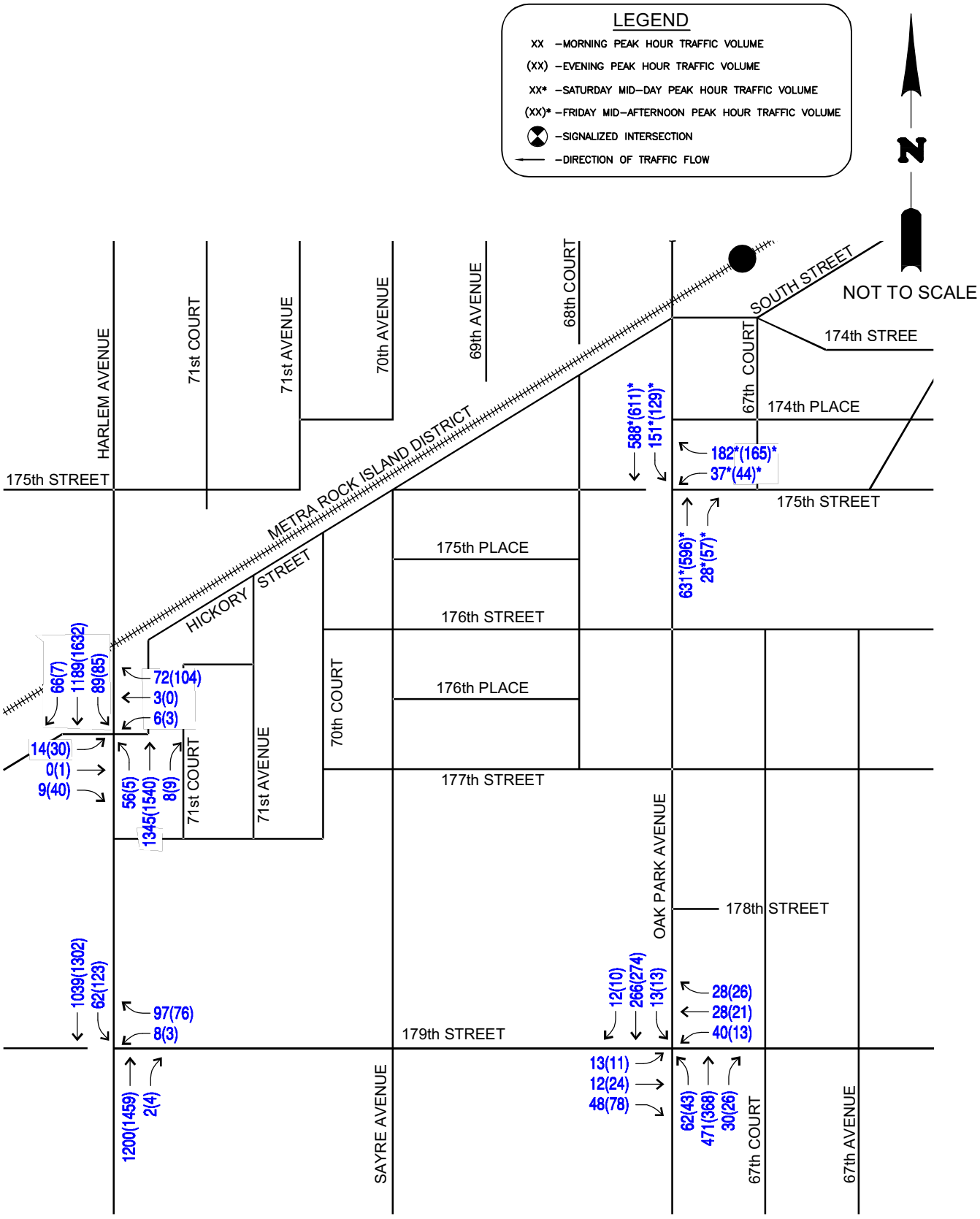

FIGURE 1
EXISTING TRAFFIC VOLUMES
DOWNTOWN TRAFFIC & PARKING STUDY
TINLEY PARK, ILLINOIS

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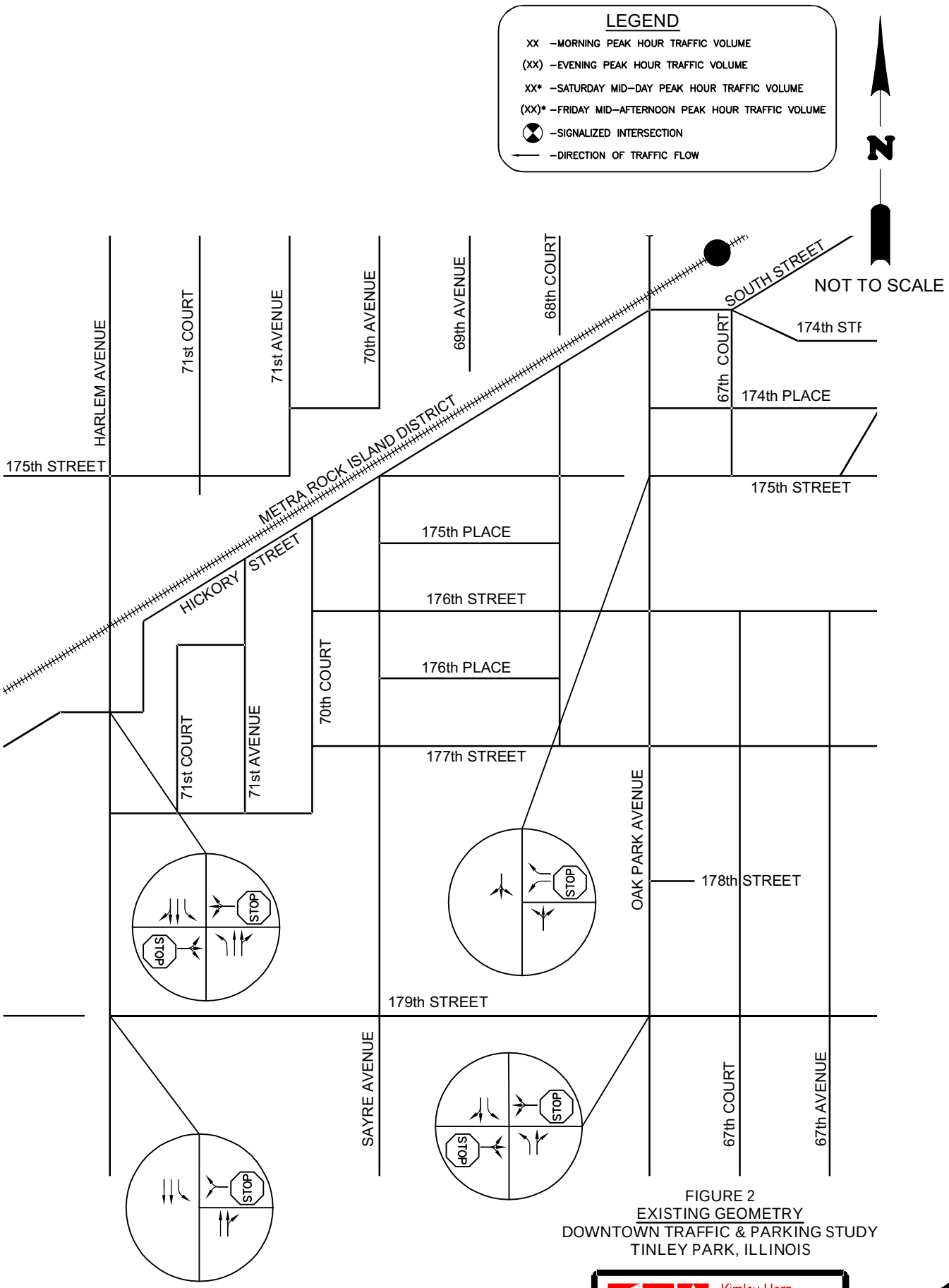

FIGURE 2
EXISTING GEOMETRY
DOWNTOWN TRAFFIC & PARKING STUDY
TINLEY PARK, ILLINOIS

Kimley-Horn and Associates, Inc.

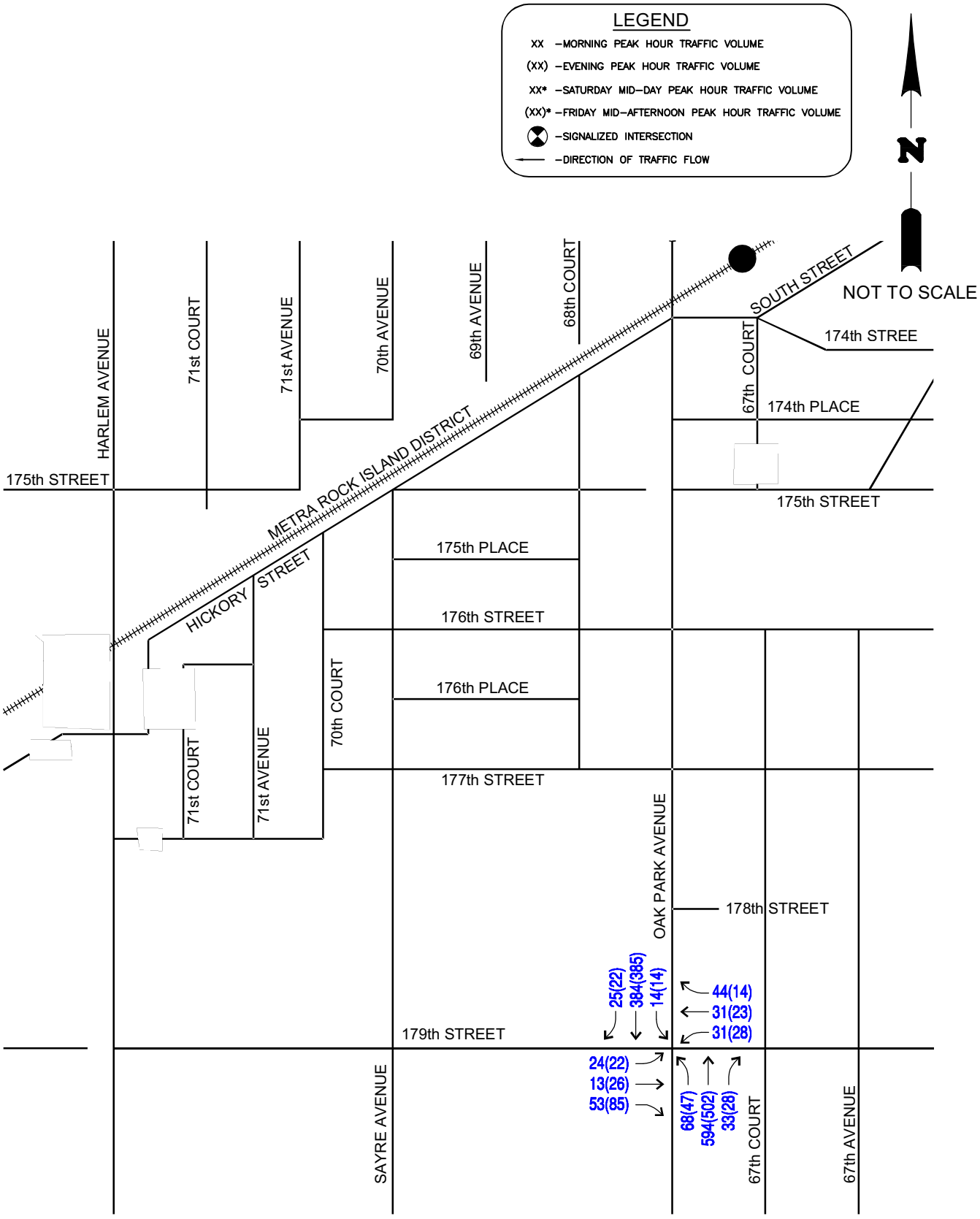

FIGURE 3
FUTURE TRAFFIC VOLUMES
DOWNTOWN TRAFFIC & PARKING STUDY
TINLEY PARK, ILLINOIS

Kimley-Horn and Associates, Inc.

179th/Harlem Avenue—Weekday, 7:00 to 9:00 AM and 4:00 to 6:00 PM

Most of the traffic on 179th enters via a left turn from southbound Harlem and exits via a right turn to northbound Harlem. Very few vehicles enter from the south on Harlem or leave to go south on Harlem. Right-turn traffic on westbound 179th and left-turn traffic from southbound Harlem are both higher in the afternoon than in the morning.

Hickory/Harlem Avenue—Weekday, 7:00 to 9:00 AM and 4:00 to 6:00 PM

The traffic flow at Hickory is very similar to that at 179th, with predominant entry to eastbound Hickory from southbound Harlem and entry to northbound Harlem with a right turn from Hickory. Unlike the 179th Street intersection, the Hickory intersection has four legs, with the west leg accessing the State of Illinois Mental Health property. The traffic on the west leg is split nearly evenly between the north and south directions, both inbound and outbound. There is almost no traffic crossing Harlem at Hickory, either east- or westbound.

Level of Service Analysis

The level of service (LOS) at the existing intersections was evaluated using the traffic counts collected in February. The LOS for the above-mentioned intersections was evaluated using the 2000 *Highway Capacity Manual* (HCM) methodology for unsignalized and signalized intersections. These techniques use traffic volumes, intersection geometry, and traffic signal timings (for signalized intersections) as inputs to estimate the average delays, queue lengths, and levels of service for movements and approaches at an intersection and for the intersection as a whole. LOS values are based on total average delay and range from LOS A (totally free-flowing traffic) to LOS F (extremely congested traffic). The interpretation of each of the LOS values and the associated average delay range is shown in Table 1. Most municipalities consider LOS values of A through D acceptable for peak-hour operation. The LOS ranges differ between signalized and unsignalized intersections. Both sets of ranges are shown in Table 1.

The results of the analysis for the intersections included in this study are shown in Table 2. The intersection of 175th and Oak Park Avenue operates at LOS A on Friday and LOS D on Saturday, primarily because of the high left-turn volume on Saturday. All of the other intersections operate at LOS A. The only problem areas are the afternoon eastbound left-turn movement at 179th and Harlem, which operates at LOS E, the eastbound left turn at Hickory at LOS F, and the left-turn movements on westbound 175th Street.

Table 1
Level of Service Criteria for Signalized *(and Unsignalized)* Intersections

Level of Service	Interpretation	Total Delay per Vehicle (seconds)
A	Very short delay. Most vehicles arrive during the green phase (for signalized intersections) and do not stop at all.	< 10.0 *< (10.0)*
B	More vehicles stopping than for LOS A, causing higher levels of average delay	10.1 – 20.0 *(10.1 – 15.0)*
C	Light congestion, the number of vehicles stopping becomes significant at this level.	20.1 – 35.0 *(15.1 – 25.0)*
D	Congestion is more noticeable, with longer delays resulting from heavy traffic demands relative to the intersection's capacity.	35.1 – 55.0 *(25.1 – 35.0)*
E	High delays result as traffic demand approaches capacity.	55.1 – 80.0 *(35.1 – 50.0)*
F	Traffic demand exceeds the capacity of the lane, approach, or intersection.	>80.0 *>(50.0)*
Source: *Highway Capacity Manual*, 2000.		

Traffic Signal Warrant Analysis—179th and Oak Park Avenue

The intersection of Oak Park Avenue with 179th Street was evaluated based on existing traffic volumes to determine whether the intersections warrant the installation of a signal. The signal warrant analysis was prepared based on the *Manual on Uniform Control Devices* (MUTCD) 2000 Millennium Edition. Warrant 3, the Peak-Hour Warrant, evaluation was prepared for the intersections. A copy of Figure 4C-3 Warrant 3–Peak Hour is provided in the Appendix in addition to the analysis worksheets for each intersection. It was determined that Warrant 3 is met at the intersection of Oak Park Avenue and 175th Street based on the existing traffic volumes. The peak-hour warrant was not met at the intersection of Oak Park Avenue and 179th Street. Additional data collection would have to be conducted to determine whether this intersection satisfies additional MUTCD warrants (although this is unlikely).

Accident Data

The Village of Tinley Park Police Department was contacted to obtain information about accidents at the two intersections on Harlem Avenue. A summary of the number of accidents since the year 2000 is shown in Table 3.

Table 2
Intersection Level of Service Analysis

Approach	Movement	AM Peak				PM Peak			
		Existing		Future		Existing		Future	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
179th Street and Oak Park Avenue									
Eastbound	Left/Thru/Right	C	15.4	B	14.6	C	23.0	C	20.3
Westbound	Left/Thru/Right	C	24.6	C	17.1	E	38.2	C	21.7
Northbound	Left	A	8.0	A	8.0	A	8.4	A	8.3
	Thru/Right	A	0.0	A	0.0	A	0.0	A	0.0
Southbound	Left	A	8.5	A	8.2	A	2.0	A	8.6
	Thru/Right	A	0.0	A	0.0	A	0.0	A	0.0
Overall Average		**A**	**4.0**	**A**	**3.4**	**A**	**5.3**	**A**	**3.9**

179th Street and Harlem Avenue					
		AM Peak		PM Peak	
Westbound	Left/Thru/Right	D	27.3	E	35.6
Northbound	Thru/Right	A	0.0	A	0.0
	Left	B	12.5	C	17.0
Southbound	Thru	A	0.0	A	0.0
Overall Average		**A**	**1.5**	**A**	**1.7**

Hickory Street and Harlem Avenue					
		AM Peak		PM Peak	
Eastbound	Left/Thru/Right	F	93.9	F	403.0
Westbound	Left/Thru/Right	D	32.9	D	27.3
Northbound	Left	B	12.8	C	15.1
	Thru/Right	A	0.0	A	0.0
Southbound	Left	B	14.5	C	16.8
	Thru/Right	A	0.0	A	0.0
Overall Average		**A**	**2.4**	**A**	**9.6**

175th Street and Oak Park Avenue					
		Friday		Saturday	
Westbound	Left	F	65.6	F	944.7
	Right	C	17.3	C	18.7
Northbound	Thru/Right	A	0.0	A	0.0
Southbound	Left	A	3.6	C	16.4
	Thru	A	0.0	A	0.0
Overall Average		**A**	**5.3**	**D**	**31.2**

Table 3
Harlem Avenue Intersections, Accident History, 2000 to February 2005

	Intersection	
Year	Hickory and Harlem	179th and Harlem
2000	1	3
2001	2	4
2002	4	2
2003	4	10
2004	3	5
to February 2005	2	0

A summary of the accident reports for each intersection is contained in the Appendix and shows the type of accident and whether it is intersection related in the judgment of the officer filling out the accident form.

While these reports clearly show a more accidents at the 179th Street intersection, there is no clear trend showing an undue number of accidents as a result of travel on 179th Street or on Hickory Street. Many of the accidents, both rear-end collisions and single-vehicle accidents, occur on Harlem Avenue at both locations. Overall, the number of yearly accidents is very small, except for 2003 at the 179th Street intersection. None of the accident data indicates any significant safety issues at either location related to current conditions on 179th Street or Hickory Street. One of the key mitigating factors for the westbound leg of the intersection is that there are very few left turns southbound across Harlem Avenue. Most of the traffic enters from northbound Harlem using a dedicated left-turn lane at both locations, and most of the westbound traffic on 179th or Hickory turns right onto Harlem. There is very little westbound traffic from either street turning left to go south on Harlem, and at Hickory almost none of the traffic proceeds across Harlem to access the mental health facility. The only location with any significant left turns at Harlem is the west leg of Hickory at the mental health facility, but there are no indications from the accident data that there are any significant safety issues with this movement.

175th Street Extension Discussion

The *Downtown Parking and Traffic Study* recommended extending 175th Street through to Hickory Street at a newly signalized intersection to provide an alternative left-turn location at Oak Park Avenue for vehicles now using South Street. The suggestion was made to consider signalizing 179th Street with the connection to Harlem because of the curve on Hickory just east of Harlem, and the need to extend 175th through to the east. Nothing in this analysis suggests

that the 179th connection would be more beneficial than the proposed 175th Street extension.

Almost all the traffic at both locations makes a left turn in a dedicated lane on southbound Harlem and exits making a right turn to northbound Harlem. The southbound left turns at both locations have a dedicated left-turn lane.

There are several clear benefits to the 175th Street extension, compared with 179th Street. The 175th Street extension with a traffic signal is a much better location to serve downtown traffic and provide a left-turn option for vehicles entering or leaving the downtown, compared with turning at the unsignalized intersection at South Street, given the relatively high peak-hour traffic volumes on Oak Park Avenue. Also, 179th Street is located much too far from downtown to serve such a function, and it is not accessible from downtown on the east side of Oak Park Avenue.

In addition to these benefits, Hickory Street is currently improved with curb and gutter for much of its length between Oak Park Avenue and Harlem. The pavement in the vicinity of the turn at the pumping station has been widened considerably to accommodate the turn at that location, and there are no significant reports of accidents on Hickory at this location. In comparison, 179th Street is not improved with curb and gutter on the west toward Harlem, and the road is narrower as well, less than 24 feet. Figures 4 and 5 show the two intersections and the respective condition of 175th Street and 179th Street.

Based on these factors, we recommend the original plan for extending 175th Street west to Hickory Street

24-Hour Tube Counts

Tube counts were conducted on Oak Park Avenue north of 175th Street for seven consecutive days beginning on Thursday, February 3, 2005, and continuing through Thursday, February 10. The tubes were laid across the pavement to detect vehicles in the northbound lane and in the southbound lane. The results of these counts are shown in Tables 4, 5 and 6. Table 4 shows the data for the northbound lane, Table 5 shows the data for the southbound lane, and Table 6 shows the combined count data for the north and the southbound lanes.

The overall peak weekday time was 4:00 PM, when the average was 1,452 vehicles in the hour between 4:00 and 5:00 PM. The next highest weekday hour was 3:00 PM, with 1,434 vehicles per hour. On the weekday, the count in both directions exceeded 1,300 vehicles from 2:00 to 6:00 PM. Friday was the highest-volume weekday, with 18,988 total vehicles, and Monday the lowest with 17,417 vehicles.

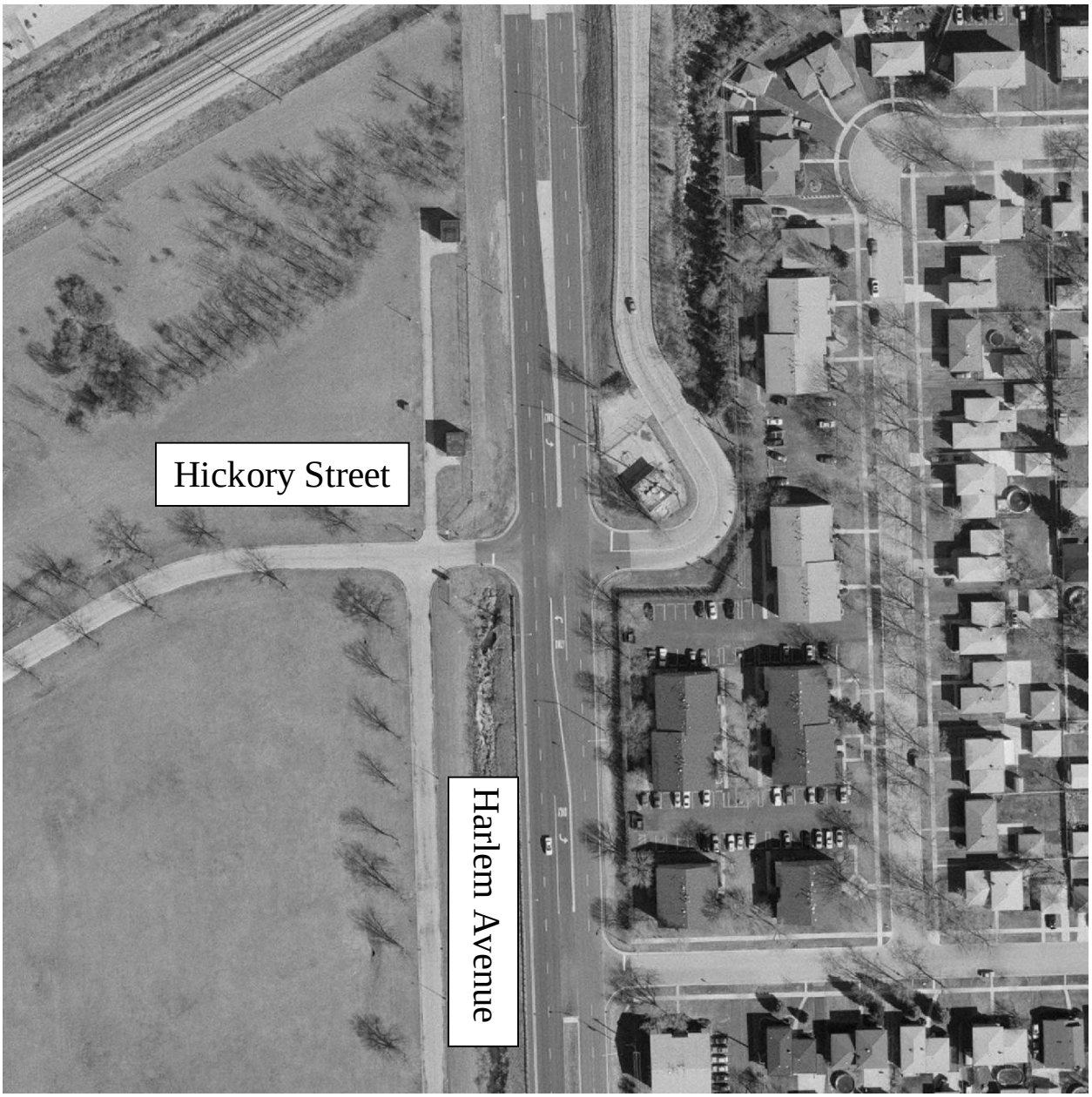

Figure 4
Harlem/Hickory Intersection
Tinley Park, Illinois

Figure 5
Harlem/179th Intersection
Tinley Park, Illinois

Table 4
24 Hour Traffic Counts
Oak Park Avenue
North of 175th Street

South Bound									
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Average Day**	**Saturday**	**Sunday**	**Average Week**
Start Time	**02/07/05**	**02/08/05**	**02/09/05**	(1)	**2/4/05**		**02/05/05**	**02/06/05**	
12:00 AM	38	57	59	63	64	56	146	149	82
1:00 AM	37	25	59	48	47	43	109	107	62
2:00 AM	21	22	24	40	45	30	91	105	50
3:00 AM	9	18	8	22	25	16	32	47	23
4:00 AM	23	30	26	33	27	28	19	33	27
5:00 AM	68	75	74	85	82	77	46	33	66
6:00 AM	264	254	248	236	233	247	109	143	212
7:00 AM	556	582	528	549	479	539	251	178	446
8:00 AM	441	424	435	406	411	423	464	347	418
9:00 AM	413	428	432	415	386	415	678	412	452
10:00 AM	477	461	509	461	466	475	745	445	509
11:00 AM	539	540	529	543	563	543	**854**	**651**	603
12:00 PM	648	637	588	585	648	621	813	635	651
1:00 PM	662	621	693	613	724	663	764	531	658
2:00 PM	679	703	757	675	659	695	753	531	680
3:00 PM	708	654	**805**	**728**	758	**731**	762	482	700
4:00 PM	711	**695**	701	712	**832**	730	603	489	678
5:00 PM	**730**	685	682	723	731	710	600	469	660
6:00 PM	611	613	680	712	699	663	511	415	606
7:00 PM	445	450	439	491	533	472	393	301	436
8:00 PM	354	328	370	394	418	373	403	232	357
9:00 PM	286	221	274	328	329	288	298	169	272
10:00 PM	164	168	162	178	273	189	232	117	185
11:00 PM	79	78	97	104	200	112	182	79	117
Total	8963	8769	9179	9144	9632	9137	9858	7100	8949
(1) Combined data from February 3 and 10, 2005									
xxx	Peak hour								

Table 5
24 Hour Traffic Counts
Oak Park Avenue
North of 175th Street

Total (North Bound + South Bound)									
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Average Day**	**Saturday**	**Sunday**	**Average Week**
Start Time	**02/07/05**	**02/08/05**	**02/09/05**	(1)	**2/4/05**		**02/05/05**	**02/06/05**	
12:00 AM	69	103	112	112	123	104	234	277	147
1:00 AM	52	53	92	74	73	69	175	183	100
2:00 AM	38	43	56	69	73	56	124	145	78
3:00 AM	32	48	43	55	58	47	83	116	62
4:00 AM	61	72	69	74	66	68	45	62	64
5:00 AM	214	243	241	238	211	229	90	56	185
6:00 AM	585	605	585	583	541	580	210	213	475
7:00 AM	1107	1213	1121	1174	1024	1128	500	380	931
8:00 AM	973	1022	1027	964	926	982	945	595	922
9:00 AM	913	966	958	927	841	921	1238	860	958
10:00 AM	949	913	962	923	936	937	1549	907	1020
11:00 AM	1082	1120	1099	1099	1158	1112	1609	1301	1210
12:00 PM	1161	1218	1193	1209	1249	1206	**1720**	**1346**	**1299**
1:00 PM	1168	1194	1245	1188	1333	1226	1566	1050	1249
2:00 PM	1387	1346	1455	1334	1304	1365	1466	1105	1342
3:00 PM	1369	1389	1506	**1419**	1489	1434	1444	1053	1381
4:00 PM	**1397**	**1406**	**1520**	1410	**1527**	**1452**	1305	1020	1369
5:00 PM	1343	1354	1317	1376	1408	1360	1319	797	1273
6:00 PM	1108	1185	1231	1299	1264	1217	1039	582	1101
7:00 PM	793	850	781	923	1031	876	786	456	803
8:00 PM	599	645	825	692	826	717	721	379	670
9:00 PM	580	430	498	664	619	558	519	421	533
10:00 PM	293	294	306	296	546	347	435	286	351
11:00 PM	144	169	185	192	362	210	342	162	222
Total	17417	17881	18427	18294	18988	18201	19464	13752	17746
(1) Combined data from February 3 and 10, 2005									
xxx	Peak hour								

Table 6
24 Hour Traffic Counts
Oak Park Avenue
North of 175th Street

Total (North Bound + South Bound)									
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Average Day**	**Saturday**	**Sunday**	**Average Week**
Start Time	**02/07/05**	**02/08/05**	**02/09/05**	(1)	**2/4/05**		**02/05/05**	**02/06/05**	
12:00 AM	69	103	112	112	123	104	234	277	147
1:00 AM	52	53	92	74	73	69	175	183	100
2:00 AM	38	43	56	69	73	56	124	145	78
3:00 AM	32	48	43	55	58	47	83	116	62
4:00 AM	61	72	69	74	66	68	45	62	64
5:00 AM	214	243	241	238	211	229	90	56	185
6:00 AM	585	605	585	583	541	580	210	213	475
7:00 AM	1107	1213	1121	1174	1024	1128	500	380	931
8:00 AM	973	1022	1027	964	926	982	945	595	922
9:00 AM	913	966	958	927	841	921	1238	860	958
10:00 AM	949	913	962	923	936	937	1549	907	1020
11:00 AM	1082	1120	1099	1099	1158	1112	1609	1301	1210
12:00 PM	1161	1218	1193	1209	1249	1206	**1720**	**1346**	**1299**
1:00 PM	1168	1194	1245	1188	1333	1226	1566	1050	1249
2:00 PM	1387	1346	1455	1334	1304	1365	1466	1105	1342
3:00 PM	1369	1389	1506	**1419**	1489	1434	1444	1053	1381
4:00 PM	**1397**	**1406**	**1520**	1410	**1527**	**1452**	1305	1020	1369
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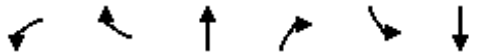
9:00 PM	580	430	498	664	619	558	519	421	533
10:00 PM	293	294	306	296	546	347	435	286	351
11:00 PM	144	169	185	192	362	210	342	162	222
Total	17417	17881	18427	18294	18988	18201	19464	13752	17746
(1) Combined data from February 3 and 10, 2005									
xxx	Peak hour								

The heaviest traffic day of the week was Saturday, with a total of 19,464 vehicles, which is about 2.5 percent higher than on a Friday. The peak hour on Saturday occurred at noon, with 1,720 vehicles, and the traffic consistently exceeded 1,400 vehicles per hour for the six-hour period between 10:00 AM and 4:00 PM. The traffic on Sunday was less than any other day, with 13,752 total vehicles. The peak hour on Sunday was also noon, with a total of 1,346 vehicles.

The results of the traffic analysis indicate a consistently high weekday traffic volume on Oak Park Avenue, from 2:00 to 6:00 PM, with the peak at 4:00 PM, which is consistent with the peak time used in the *Downtown Traffic and Parking Study*. The overall traffic on Saturday was slightly heavier than on the weekday, with the highest traffic volume at noon. On Saturday in the evening after 5:00 PM, the traffic volumes decease substantially. This benefits the North Street development because the peak Saturday time for the restaurants and theater occurs after 5:00 PM.

Kimley-Horn
and Associates, Inc.

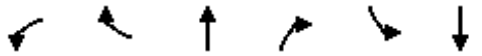
Appendix A
Traffic Capacity Analysis



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	44	165	596	57	129	611
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	46	174	627	60	136	643
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1572	657			687	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1572	657			687	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	55	63			85	
cM capacity (veh/h)	103	465			907	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	46	174	687	779
Volume Left	46	0	0	136
Volume Right	0	174	60	0
cSH	103	465	1700	907
Volume to Capacity	0.45	0.37	0.40	0.15
Queue Length (ft)	48	43	0	13
Control Delay (s)	65.6	17.3	0.0	3.6
Lane LOS	F	C		A
Approach Delay (s)	27.5		0.0	3.6
Approach LOS	D			

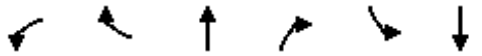
Intersection Summary			
Average Delay	5.3		
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	37	182	631	28	588	151
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	39	192	664	29	619	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2076	679			694	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2076	679			694	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	58			31	
cM capacity (veh/h)	18	452			902	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1
Volume Total	39	192	694	778
Volume Left	39	0	0	619
Volume Right	0	192	29	0
cSH	18	452	1700	902
Volume to Capacity	2.11	0.42	0.41	0.69
Queue Length (ft)	133	52	0	142
Control Delay (s)	944.7	18.7	0.0	16.4
Lane LOS	F	C		C
Approach Delay (s)	175.2		0.0	16.4
Approach LOS	F			

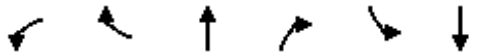
Intersection Summary			
Average Delay	31.2		
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	3	76	1459	4	123	1302
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	80	1536	4	129	1371
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2482	770			1540	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2482	770			1540	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	81	77			70	
cM capacity (veh/h)	17	343			427	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	83	1024	516	129	685	685
Volume Left	3	0	0	129	0	0
Volume Right	80	0	4	0	0	0
cSH	198	1700	1700	427	1700	1700
Volume to Capacity	0.42	0.60	0.30	0.30	0.40	0.40
Queue Length (ft)	48	0	0	32	0	0
Control Delay (s)	35.6	0.0	0.0	17.0	0.0	0.0
Lane LOS	E			C		
Approach Delay (s)	35.6	0.0		1.5		
Approach LOS	E					

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	62.1%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	8	97	1200	2	62	1039
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	102	1263	2	65	1094
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1942	633			1265	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1942	633			1265	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	83	76			88	
cM capacity (veh/h)	50	423			545	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	111	842	423	65	547	547
Volume Left	8	0	0	65	0	0
Volume Right	102	0	2	0	0	0
cSH	270	1700	1700	545	1700	1700
Volume to Capacity	0.41	0.50	0.25	0.12	0.32	0.32
Queue Length (ft)	47	0	0	10	0	0
Control Delay (s)	27.3	0.0	0.0	12.5	0.0	0.0
Lane LOS	D			B		
Approach Delay (s)	27.3	0.0		0.7		
Approach LOS	D					

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	14	0	9	6	3	72	56	1345	8	89	1189	66
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	15	0	9	6	3	76	59	1416	8	94	1252	69
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)								1270				
pX, platoon unblocked												
vC, conflicting volume	2377	3016	661	2361	3046	712	1321			1424		
vC1, stage 1 conf vol	1474	1474		1538	1538							
vC2, stage 2 conf vol	903	1542		823	1508							
vCu, unblocked vol	2377	3016	661	2361	3046	712	1321			1424		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	64	100	98	88	92	80	89			80		
cM capacity (veh/h)	41	32	405	52	41	375	519			474		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	85	59	944	480	94	834	487
Volume Left	15	6	59	0	0	94	0	0
Volume Right	9	76	0	0	8	0	0	69
cSH	63	212	519	1700	1700	474	1700	1700
Volume to Capacity	0.38	0.40	0.11	0.56	0.28	0.20	0.49	0.29
Queue Length (ft)	36	45	10	0	0	18	0	0
Control Delay (s)	93.9	32.9	12.8	0.0	0.0	14.5	0.0	0.0
Lane LOS	F	D	B			B		
Approach Delay (s)	93.9	32.9	0.5			1.0		
Approach LOS	F	D						

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	58.4%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	30	1	40	3	0	104	5	1540	9	85	1632	7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	1	42	3	0	109	5	1621	9	89	1718	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2831	3542	863	2717	3541	815	1725			1631		
vC1, stage 1 conf vol	1901	1901		1636	1636							
vC2, stage 2 conf vol	931	1641		1081	1904							
vCu, unblocked vol	2831	3542	863	2717	3541	815	1725			1631		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	96	86	93	100	66	99			77		
cM capacity (veh/h)	25	27	298	44	38	320	362			394		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	75	113	5	1081	550	89	1145	580
Volume Left	32	3	5	0	0	89	0	0
Volume Right	42	109	0	0	9	0	0	7
cSH	52	272	362	1700	1700	394	1700	1700
Volume to Capacity	1.43	0.41	0.01	0.64	0.32	0.23	0.67	0.34
Queue Length (ft)	172	48	1	0	0	22	0	0
Control Delay (s)	403.0	27.3	15.1	0.0	0.0	16.8	0.0	0.0
Lane LOS	F	D	C			C		
Approach Delay (s)	403.0	27.3	0.0			0.8		
Approach LOS	F	D						

Intersection Summary				
Average Delay	9.6			
Intersection Capacity Utilization	69.5%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	11	24	78	13	21	26	43	368	26	13	274	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	12	25	82	14	22	27	45	387	27	14	288	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	837	826	294	902	818	401	299			415		
vC1, stage 1 conf vol	321	321		492	492							
vC2, stage 2 conf vol	516	505		411	326							
vCu, unblocked vol	837	826	294	902	818	401	299			415		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	91	89	94	92	96	96			99		
cM capacity (veh/h)	267	290	746	242	290	649	1262			1144		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	119	63	45	415	14	299
Volume Left	12	14	45	0	14	0
Volume Right	82	27	0	27	0	11
cSH	494	361	1262	1700	1144	1700
Volume to Capacity	0.24	0.17	0.04	0.24	0.01	0.18
Queue Length (ft)	23	16	3	0	1	0
Control Delay (s)	14.6	17.1	8.0	0.0	8.2	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	14.6	17.1	0.8		0.4	
Approach LOS	B	C				

Intersection Summary				
Average Delay	3.4			
Intersection Capacity Utilization	41.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	22	26	85	14	23	28	47	502	28	14	385	22
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	23	27	89	15	24	29	49	528	29	15	405	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1115	1103	417	1180	1100	543	428			558		
vC1, stage 1 conf vol	446	446		642	642							
vC2, stage 2 conf vol	669	657		538	458							
vCu, unblocked vol	1115	1103	417	1180	1100	543	428			558		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	88	86	92	89	95	96			99		
cM capacity (veh/h)	202	231	636	180	230	540	1131			1013		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	140	68	49	558	15	428
Volume Left	23	15	49	0	15	0
Volume Right	89	29	0	29	0	23
cSH	374	283	1131	1700	1013	1700
Volume to Capacity	0.37	0.24	0.04	0.33	0.01	0.25
Queue Length (ft)	42	23	3	0	1	0
Control Delay (s)	20.3	21.7	8.3	0.0	8.6	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.3	21.7	0.7		0.3	
Approach LOS	C	C				

Intersection Summary				
Average Delay	3.9			
Intersection Capacity Utilization	51.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	13	12	48	40	28	28	62	471	30	13	266	12
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	13	51	42	29	29	65	496	32	14	280	13
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	984	972	286	1006	962	512	293			527		
vC1, stage 1 conf vol	314	314		642	642							
vC2, stage 2 conf vol	671	658		364	320							
vCu, unblocked vol	984	972	286	1006	962	512	293			527		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	95	93	81	88	95	95			99		
cM capacity (veh/h)	215	248	753	226	250	562	1269			1040		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	77	101	65	527	14	293
Volume Left	14	42	65	0	14	0
Volume Right	51	29	0	32	0	13
cSH	423	283	1269	1700	1040	1700
Volume to Capacity	0.18	0.36	0.05	0.31	0.01	0.17
Queue Length (ft)	16	39	4	0	1	0
Control Delay (s)	15.4	24.6	8.0	0.0	8.5	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	15.4	24.6	0.9		0.4	
Approach LOS	C	C				

Intersection Summary				
Average Delay	4.0			
Intersection Capacity Utilization	50.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	24	13	53	44	31	31	68	594	33	25	384	14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	14	56	46	33	33	72	625	35	26	404	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh)		0			0							
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1282	1267	412	1305	1257	643	419			660		
vC1, stage 1 conf vol	464	464		786	786							
vC2, stage 2 conf vol	817	803		519	472							
vCu, unblocked vol	1282	1267	412	1305	1257	643	419			660		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	93	91	72	83	93	94			97		
cM capacity (veh/h)	154	192	640	166	195	474	1140			928		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	95	112	72	660	26	419
Volume Left	25	46	72	0	26	0
Volume Right	56	33	0	35	0	15
cSH	294	216	1140	1700	928	1700
Volume to Capacity	0.32	0.52	0.06	0.39	0.03	0.25
Queue Length (ft)	34	66	5	0	2	0
Control Delay (s)	23.0	38.2	8.4	0.0	9.0	0.0
Lane LOS	C	E	A		A	
Approach Delay (s)	23.0	38.2	0.8		0.5	
Approach LOS	C	E				

Intersection Summary				
Average Delay	5.3			
Intersection Capacity Utilization	56.2%	ICU Level of Service	B	
Analysis Period (min)	15			

Kimley-Horn
and Associates, Inc.

Appendix B
Accident History, 2000 to February 2005
Harlem with 179th and Hickory

Appendix B Table 1
Accident History, 2000 to February 2005
Intersection of Harlem and 179th—Tinley Park, Illinois

Date	Time	Type	Intersection Related?
5/04/00	6:00 PM	Left-turn from 179th	Y
12/13/00	5:00 PM	N/A	Y
12/27/00	Unknown	Driver hit lightpole on Harlem NB	N
1/30/01	7:00 PM	Spin out on ice on 179th	N
4/13/01	5:00 PM	Rear end collision on Harlem Ave	N
7/28/01	9:00 PM		Y
8/11/01	11:00 AM	U-turn on Harlem	N
6/12/02	7:00 PM	Harlem SB left-turn, hit by NB on Harlem	N
8/05/02	11:00 AM	N/A	Y
12/29/02	8:00 PM	N/A	N
1/6/03	7:00 AM	N/A	N
1/31/03	12:00 PM	N/A	Y
3/4/03	8:00 PM	N/A	N
3/11/03	12:00 PM	N/A	N
4/10/03	4:00 PM	N/A	N
4/12/03	2:00 PM	N/A	Y
7/18/03	6:00 PM	N/A	N
8/29/03	2:00 PM	N/A	Y
9/8/03	6:00 PM	N/A	N
11/8/03	5:00 PM	Harlem SB left turn	Y
5/20/04	10:00 PM	N/A	N
7/17/04	11:00 AM	NB vehicle on Harlem hit right turn to 179th	Y
8/13/04	9:00 PM	N/A	N
9/19/04	9:00 PM	N//A	N
11/06/04	11:00 AM	Harlem Avenue rear-end collision	N

Appendix B Table 2
Accident History, 2000 to February 2005
Intersection of Harlem and Hickory—Tinley Park, Illinois

Date	Time	Type	Intersection Related?
12/11/00	5:00 PM	NB Harlem hit car coming from EB Hickory	Y
1/26/01	5:00 PM	N/A	N
10/19/01	5:00 PM	N/A	N
5/30/02	12:00 PM	N/A	N
6/13/02	3:00 PM	N/A	Y
10/15/02	4:00 PM	EB from Hickory hit by SB on Harlem	Y
12/26/02	10:00 PM	N/A	Y
3/7/03	4:00 PM	N/A	N
3/10/03	3:00 PM	N/A	Y
7/16/03	4:00 PM	N/A	Y
8/14/03	5:00 PM	NB on Harlem hit right turn on Hickory WB	Y
2/19/04	5:00 PM	N/A	Y
8/27/04	12:00 PM	Rear-end on Harlem	Y
10/27/04	4:00 PM	N/A	Y
2/4/05	5:00 PM	Rear-end on Harlem	Y
2/20/05	8:00 PM	SB on Harlem; single car struck guard rail	N

Kimley-Horn
and Associates, Inc.

Appendix C
Signal Warrant Analysis
179th and Oak Park Avenue

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2000 MUTCD)

MAJOR STREET: **Oak Street** NB SB # OF APPROACH LANES: **1**

MINOR STREET: **179th Street** EB WB # OF APPROACH LANES: **1**

CITY, STATE: **Tinley Park, IL**

COMMENTS: Future Volumes w/o the extension of 175th Street
Right Turn Volume included

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N): **N**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N): **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
					MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES					**500**	**150**		**750**	**75**		**400**	**120**		**600**	**60**			
06:00 AM	TO	07:00 AM	0	0														
07:00 AM	TO	08:00 AM	1,118	106	Y			Y	Y	**Y**	Y			Y	Y	**Y**	**Y**	
08:00 AM	TO	09:00 AM	0	0														
09:00 AM	TO	10:00 AM	0	0														
10:00 AM	TO	11:00 AM	0	0														
11:00 AM	TO	12:00 PM	0	0														
12:00 PM	TO	01:00 PM	0	0														
01:00 PM	TO	02:00 PM	0	0														
02:00 PM	TO	03:00 PM	0	0														
03:00 PM	TO	04:00 PM	0	0														
04:00 PM	TO	05:00 PM	998	133	Y			Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	
05:00 PM	TO	06:00 PM	0	0														
06:00 PM	TO	07:00 PM	0	0														
07:00 PM	TO	08:00 PM	0	0														
08:00 PM	TO	09:00 PM	0	0														
09:00 PM	TO	10:00 PM	0	0														
			2,116	239	2	0	**0**	2	2	**2**	2	1	**1**	2	2	**2**	**2**	**0**
					8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
					NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**NOT SATISFIED**

02/21/05
Kimley-Horn and Associates