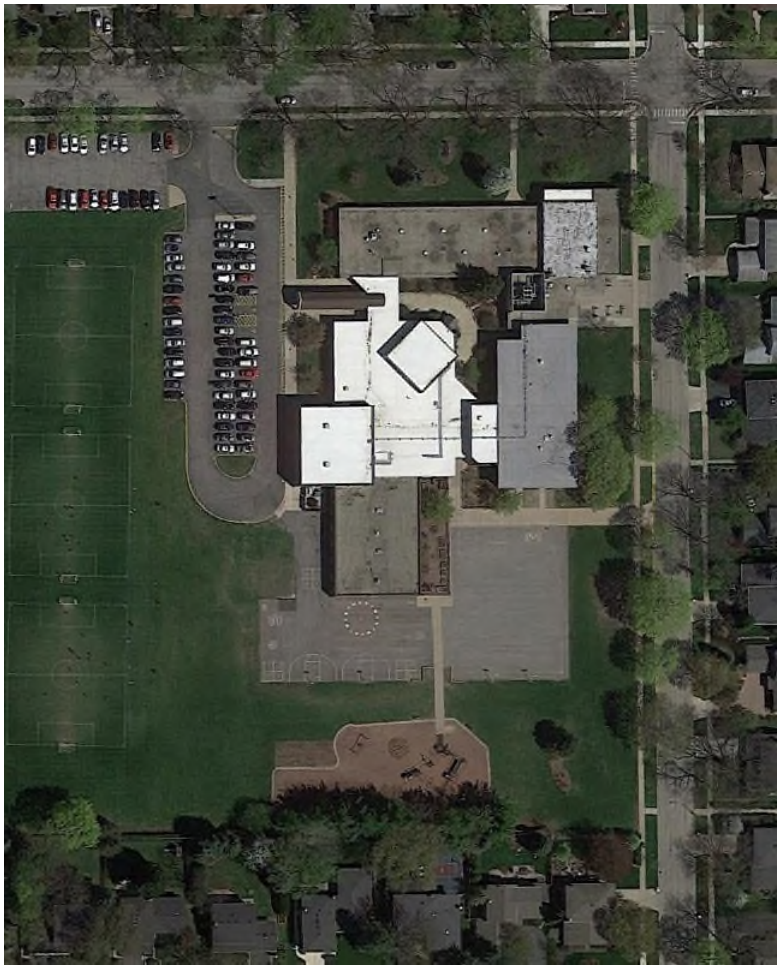
January 2017

Windsor Elementary School

Traffic and Parking Study



Prepared for:

Arlington Heights School District 25

Eriksson Engineering Associates, Ltd.

145 Commerce Drive, Suite A

Grayslake, IL 60030

(847) 223-4804

601 W. Randolph St., Suite 500

Chicago, IL 60661

(312) 463-0551

INTRODUCTION

Eriksson Engineering Associates, Ltd. (EEA) was retained by Arlington Heights School District 25 (AHSD 25) to conduct a traffic and parking study for the proposed expansion of Windsor Elementary School in Arlington Heights, Illinois.

The purpose of the study was to observe the existing traffic patterns around the school, determine the traffic characteristics of the existing and expanded school, review the parking needs, and develop roadway and parking recommendations.

EXISTING CONDITIONS

Site Location and Area Land-Uses

Windsor Elementary School is located at 1315 East Miner Street in Arlington Heights, Illinois. The site is bounded by Windsor Drive to the east, Miner Street to the north, single-family homes to the south, and Miner School/soccer fields to the west. Miner School is a therapeutic day school run by the Northwest Suburban Special Education Organization (NSSEO). **Figure 1** illustrates the site location and the surrounding land-uses and roads. (Note: all figures are located at the end of the report).

Bicycle and Pedestrian Routes

Miner Street and Windsor Drive are designated on-street bike routes. Public sidewalks are located on both sides of each street around the school. The All-Way Stop Controlled (AWSC) intersection of Miner Street and Windsor Drive has crosswalks on the east, west, and south legs. The intersection of Kensington Road and Windsor Drive has crosswalks on the north, south, and west legs. During arrival and dismissal, one adult crossing guard is located at each of these intersections. Two student crossing guards assist at the Miner/Windsor and a third monitors the west lot parking entrance sidewalk crossing.

Roadway Characteristics

A description of the area roadways accessing the school is provided below:

Kensington Road is an east-west secondary arterial roadway with one travel lane in each direction and a center painted median. It has a 30 mph speed limit with a 20 mph school speed limit approaching the Windsor Drive intersection. At Windsor Drive, the center left-turn median is painted as separate eastbound and westbound left-turn lanes. High visibility crosswalks are provided on the north, south, and west legs. Kensington Road is under the jurisdiction of the Village of Arlington Heights.

Miner Street is an east-west collector roadway. It has a 25 mph speed limit with a 20 mph school speed limit by Windsor Elementary and Miner Schools. At its All-Way-Stop Controlled (AWSC) intersection with Windsor Drive, it has one travel lane in each direction and high visibility pedestrian crosswalks on the east, west, and south legs. Adjacent to the school property, the south side of Minor Street is posted as a student pick-up/drop-off zone from 8-9 AM and 3-4 PM on school days from the school sign to Windsor Drive. Miner Street is under the jurisdiction of the Village of Arlington Heights.

Windsor Drive is a north-south local residential street. It has one lane in each direction and on-street parking through the residential areas. It is under the jurisdiction of the Village of Arlington Heights with a 25 mph posted speed limit and a 20 mph school speed zone. It is a designated on-street bike route. Adjacent to the school property, the west side of Windsor

Drive is posted as a student pick-up/drop-off zone from 8-9 AM and 3-4 PM on school days. The east side of Windsor is posted No Stopping or Standing - 8:00 AM to 4:00 PM on school days. Northbound Windsor Drive is posted with Do Not Enter signs at Campbell Street to the south of the site from 8:30 to 9:15 AM.

Campbell Street (East and West) is an east-west residential street south of the school with an off-set intersection at Windsor Drive. It is under the jurisdiction of the Village of Arlington Heights with a 25 mph posted speed limit. Both approaches are under stop-sign control at Windsor Drive.

Existing Traffic Volumes

Weekday morning arrival (8:00-9:30 AM) and afternoon dismissal (3:00-4:30 PM) manual traffic counts were conducted along Windsor Drive and Miner Street. Peak-hours of school traffic occurred from 8:15 to 9:15 AM and 3:00 to 4:00 PM on a school weekday. Traffic volumes at Kensington Road and Windsor Drive peaked at 8:30-9:30 AM due to the level of commuter through traffic on Kensington Road. The existing traffic volumes are shown on **Figure 2** and included in the **Appendix**.

School Observations

Windsor School does not provide bussing for its students due to its close proximity to the school's residential areas and a crossing guard is provided at Kensington Road.

The main student loading area is the west side of Windsor Drive south of Miner Street. Staff members assist in loading students out of or into the vehicle. During the morning arrival, parents drop-off their students in the parking lot with minimal congestion. Parents also park on Windsor Street north of Miner Street and at West Campbell Street and walk their students to school. In the afternoon dismissal, parents fill up the loading areas along the school frontage, Windsor Drive to the north, and at Campbell Street.

Student loading is also located in the staff/visitor parking lot on the west side of the school for parent drop-off and pick-up of special education students. Parents enter and exit the lot from Miner Street and travel counter-clockwise through the lot.

As with most other schools, congestion occurs in the area and lasts 10 to 15 minutes during the peak arrival and dismissal periods.

The traffic counts indicated that the northbound Windsor signage restricting traffic north of Campbell has not been very effective. After discussions with the school district and the Village of Arlington Heights, cones have placed in the northbound lane just north of Campbell Drive to enforce the restriction.

SITE TRAFFIC CHARACTERISTICS

Site Plan

The proposed building plan includes additional commons space, a new gym, and new classrooms. The west parking lot circulation was modified due to the encroachment of the expanded building to create separate inbound and outbound drives to the lot. Student loading will remain counter clockwise within the redesigned west lot.

School Trip Generation

The school currently serves 509 Kindergarten thru 5th Grade students. Classroom hours are from 9:05 AM to 3:35 PM. Attendance boundaries are formed by Arlington Heights Road to the west, Northwest Highway to the southwest, Dale and Foster Avenues to the east, Euclid Avenue to the north, and Gregory Street to the south. A copy of the school boundary map is in the **Appendix**.

The school expansion will provide more room for the projected student population with a new gym and classrooms. The number of class rooms will increase from 28 rooms, including two mobile classrooms, to 32 permanent rooms. The mobile classrooms would be removed. Student population is expected to grow by 86 students to 595 students over the next five years. The number of staff is expected to grow from 88 to 95 persons.

Traffic estimates were made for the additional students using the traffic counts at the current school. The trip generation rates for the school are higher than the data provided by the Institute of Transportation Engineer's Trip Generation, 9th Ed. manual for elementary schools due to a higher percentage of automobile usage and no busing. The rate of vehicle trip generation was applied to the proposed increase in students with the results shown in **Table 1**.

Table 1
School Expansion Traffic Volumes

Scenario	Morning Arrival			Afternoon Dismissal		
	In	Out	Total	In	Out	Total
Trip Generation Based on Existing Traffic Volumes						
Existing 509 Students	222	182	404	131	140	271
Total 595 Students	259	213	472	153	164	317
Net Additional Traffic	**+37**	**+31**	**+68**	**+22**	**+24**	**+46**
ITE Trip Generation Comparison(1)						
Existing 509 Students	126	103	229	64	78	142
Total 595 Students	147	121	268	75	92	167
Net Additional Traffic(2)	**+21**	**+18**	**+39**	**+11**	**+14**	**+25**

(1) ITE Trip Generation Manual, 9th Edition – Land Use Code 520 (Elementary School)
(2) For comparison only – Not used for analyses

Carpooling was explored as a means to reduce traffic at Windsor School. It has been EEA's experience that carpooling does not materially reduce the traffic volumes at an elementary grade level. One reason is that some carpooling already happens with families/neighbors that live near each other. Carpooling is less effective when the two parties live further away which

result in longer travel time than driving right to the school. Other obstacles include after school schedules and the provision of car seats. The school district can still encourage parents to car pool and let interested families who contact each other and work out their own arrangements. However, the school district can't compel the families to carpool.

Trip Assignment

The trip distribution for school is based on the existing traffic volumes at the school and the existing road network, and site plan. The future vehicular trips that are generated by the expansion were distributed to the area roadways based on the proposed expansion plan.

The west parking lot is currently used for staff and visitors to park and for the morning drop-off and afternoon pick-up of special education students who require assistance getting from the vehicle to the school building. In conjunction with the expansion of the school, a portion of the school's students will be shifted into the west lot to reduce the volume of loading traffic along Windsor Drive. The school has approximately 590 feet of frontage on Windsor Drive and will have 525 feet within the west parking lot. School officials are in the process of determining which students will be redirected to use the parking lot instead of the street to evenly distribute the traffic load. They may be selected by class or by geography (i.e. students living to the west would use the west lot resulting in less traffic at Windsor Drive and Miner Street intersection. When the school reaches its peak population of 595 students, 225 students will be directed to the west lot including 60 special education students and 165 other students. **Table 2** summarizes the existing and projected traffic volumes in the west lot and on-street by the school.

Table 2
School Expansion Traffic Volumes

Scenario	Morning Arrival			Afternoon Dismissal		
	In	Out	Total	In	Out	Total
Existing Traffic Volumes						
West Lot(1) – 55 students	96	57	153	56	65	121
On-Street(2) – 454 students	126	125	251	75	75	150
Existing 509 Students	222	182	404	131	140	271
Projected Traffic Volumes						
West Lot(3) – 225 students	151	108	259	89	99	188
On-Street(4) – 370 students	108	105	213	64	65	129
Total 595 Students	259	213	472	153	164	317

(1) Existing West Lot used by Staff, Visitors, and Special Education Student Loading (55 pupils)
(2) On-Street traffic using existing streets for loading or students walking
(3) Proposed West Lot used by staff, visitors, Special Education (60 pupils), and 165 other students.
(4) 19% reduction in on-street activity

Figure 3 shows the Total Traffic volumes. The total volumes assume that the additional counter measures will be effective in restricting northbound traffic during the morning and afternoon dismissal periods on Windsor Drive, relocation of a portion of the existing school traffic to the west lot, and the new traffic using the west lot.

ANALYSES

Intersection Capacity Analyses

An intersection's ability to accommodate traffic flow is based on the average control delay experienced by vehicles passing through the intersection. The intersection and individual traffic movements are assigned a level of service (LOS), ranging from A to F based on the control delay created by a traffic signal or stop sign. Control delay consists of the initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. LOS A has the best traffic flow and least delay. LOS E represents saturated or at capacity conditions. LOS F experiences oversaturated conditions and 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 3**.

Table 3
Level of Service Criteria for Intersections

Level of Service	Description	Control Delay (seconds/vehicle)	
		Signals	Stop Signs
A	Minimal delay and few stops	<10	<10
B	Low delay with more stops	>10-20	>10-15
C	Light congestion	>20-35	>15-25
D	Congestion is more noticeable with longer delays	>35-55	>25-35
E	High delays and number of stops	>55-80	>35-50
F	Unacceptable delays and over capacity	>80	>50

Source: Highway Capacity Manual 2010

Capacity analyses were conducted for each intersection using the computer program Highway Capacity Software (HCS) to determine the existing operating conditions of the access system. These analyses were performed for the school's peak arrival and dismissal periods. **Table 4** shows the existing and future level of service results for each intersection. Copies of the capacity analysis summaries are included in the **Appendix**.

Shared Exit onto Miner Street

The east-west parking lot along Miner Street has as exit only drive with northbound left- and right-turn lanes that is used by the staff parking at both schools and the Miner School loading area. It is located on the Miner School property. No changes are proposed to this intersection which will operate at a good level of service.

Windsor School Access on Miner Street

The existing driveway just west of the school building serves the staff parking lot and the loading area for special needs students. Currently, the drive has one inbound and two outbound lanes (left and right). With the reconfiguration of the staff parking lot and loading zone, the access to this lot will be split into separate inbound and outbound drives. Inbound traffic will enter the new west driveway. Outbound traffic will exit the east driveway with two outbound lanes (left and right). Currently a single student crossing guard monitors the single

driveway and helps students to crossing the drive. Two student crossing guards will be needed with the two drives for the parking lot.

Table 4
Intersection Level of Service and Delay

Intersection	Movement	AM Arrival		PM Dismissal	
		Existing	Future	Existing	Future
Shared School Lot Exit Only on Miner Street (Two-Way Stop)	**NB Lt/Rt**	B-11.0	B-11.6	B-12.7	B-13.3
Windsor School Lot Entrance Only On Miner Street (Two-Way Stop)	**WB Left**	A-7.9(1)	A-8.0	A-7.9(1)	A-8.0
	NB Lt/Rt	B-11.2(1)	--	B-11.7(1)	--
Windsor School Lot Exit Only On Miner Street (Two-Way Stop)	**Nb Lt**	--	B-11.0	--	B-11.6
	NB Rt	--	A-9.3	-	A-9.5
Windsor Drive At Miner Street (All-Way Stop)	**SB Lt/Th/Rt**	A-8.2	A-8.1	A-7.7	A-7.6
	WB Lt/Th/Rt	A-9.3	A-9.0	A-7.9	A-8.0
	NB Lt/Th/Rt	A-8.5	-	A-7.9	-
	EB Lt/Th/Rt	A-8.4	A-8.4	A-7.8	A-7.9
West Campbell At Windsor Street (Two-Way Control)	**NB Th/Lt**	A-8.5	A-8.4	A-8.1	A-8.0
	EB Lt/Rt	B-11.8	B-11.3	B-10.4	B-10.2
East Campbell At Windsor Street (Two-Way Control)	**SB Th/Lt**	A-7.7	A-7.5	A-7.8	A-7.5
	WB Lt/Rt	B-14.4	B-12.5	B-12.7	B-10.8
Windsor Drive At Kensington Road (Two-Way Stop)	**SB Lt/Th/Rt**	C-22.6	C-19.8	C-19.4	C-17.7
	WB Left	A-8.1	A-8.1	A-8.0	A-8.0
	NB Lt/Th/Rt	C-16.1	C-15.1	C-18.1	C-15.8
	EB Left	A-8.1	A-8.0	A-8.3	A-8.3

(1) Currently a single full access driveway

Windsor Drive at Miner Street

The all-way-stop intersection will continue to at an acceptable level of service. Periodic congestion does occur at the intersection when pedestrians cross and traffic is stopped. It is recommended to prohibit parking on east side of Windsor Drive, north of Miner Street, and on the north side of Miner Street, east of Windsor Drive where parking on both sides of the street restricts the sight distance and maneuverability of traffic by the intersection. Both sections would be approximately 250 feet long and the restriction would only apply to school days for designated hours.

Campbell Street at Windsor Drive

South of the school, a few students are dropped-off and picked-up in the Campbell Street (West). The existing restriction of morning traffic on northbound Windsor Drive has been supplemented with traffic cones provided by school staff to further enforce the restriction and is working well. It is recommended that this restriction be extended to the afternoon dismissal period (3:15 to 4:00 PM).

Kensington Road at Windsor Drive

Due to the minimal increase in school traffic and better enforcement of the northbound Windsor restriction, the intersection will continue to work well and requires no additional improvements.

Operational Improvements

It has been suggested that having additional staffing along the Windsor loading area by staff and volunteers to help students help ease some of the congestion issues by getting kids into and out of the cars faster. With the changes to the west parking lot and shifting students to that location, additional staffing for Windsor will not likely be needed with the reduction in its use. However, additional staffing will be needed in the west parking lot. The school district is in the process of evaluating the total number of staff and volunteers for each location. **Figure 4** shows the school loading zones.

PARKING

The existing school on-site parking supply provides a total of 89 parking spaces including two accessible spaces. With the proposed changes to the parking lot, there will be 96 regular spaces and five accessible spaces for a total of 101 spaces. Windsor and Minor Schools share additional parking to the west.

The Village of Arlington Heights Zoning Ordinance requires elementary schools to provide two parking spaces per each employee (95 staff) and one per classroom (32 rooms) for a total of 222 spaces. A parking variation of 121 spaces would be required. Land banked parking with 19 additional spaces is provided, if needed, in the future (See **Figure 5**).

National parking data is available from the Institute of Transportation Engineers (ITE) in their publication *Parking Generation*, 4th Edition for elementary schools (Land Use Code 520). The peak demand in the ITE data was 0.17 spaces per student (595 students) or 101 spaces.

Parking counts were conducted in May, 2016 after the morning arrival period which found only a few open spots on-site for staff and visitors (82 cars or 92% occupied). No on-street parking near Windsor School was observed. The school currently has 88 staff members but they are not all present on-site at the same time.

A second parking count was conducted on January 24, 2017. That count found 56 vehicles in the west parking lot (97%) and a total of 67 vehicles in the east-west lot between the two schools. Within the east-west lot, 30 vehicles were parked on the west side of the lot (Minor School parking) and 37 vehicles on the east side of the lot (Windsor School parking). The ease-west lot has 77 spaces of which 31 spaces are on Windsor School property. There were 10 empty spots in the middle between the two groups of vehicles.

The second count had a higher demand of 93 spaces for Windsor School (56+37 vehicles). Assuming an increase in parking for 95 school staff, the overall demand would be 100 spaces (95 staff and 5 visitors).

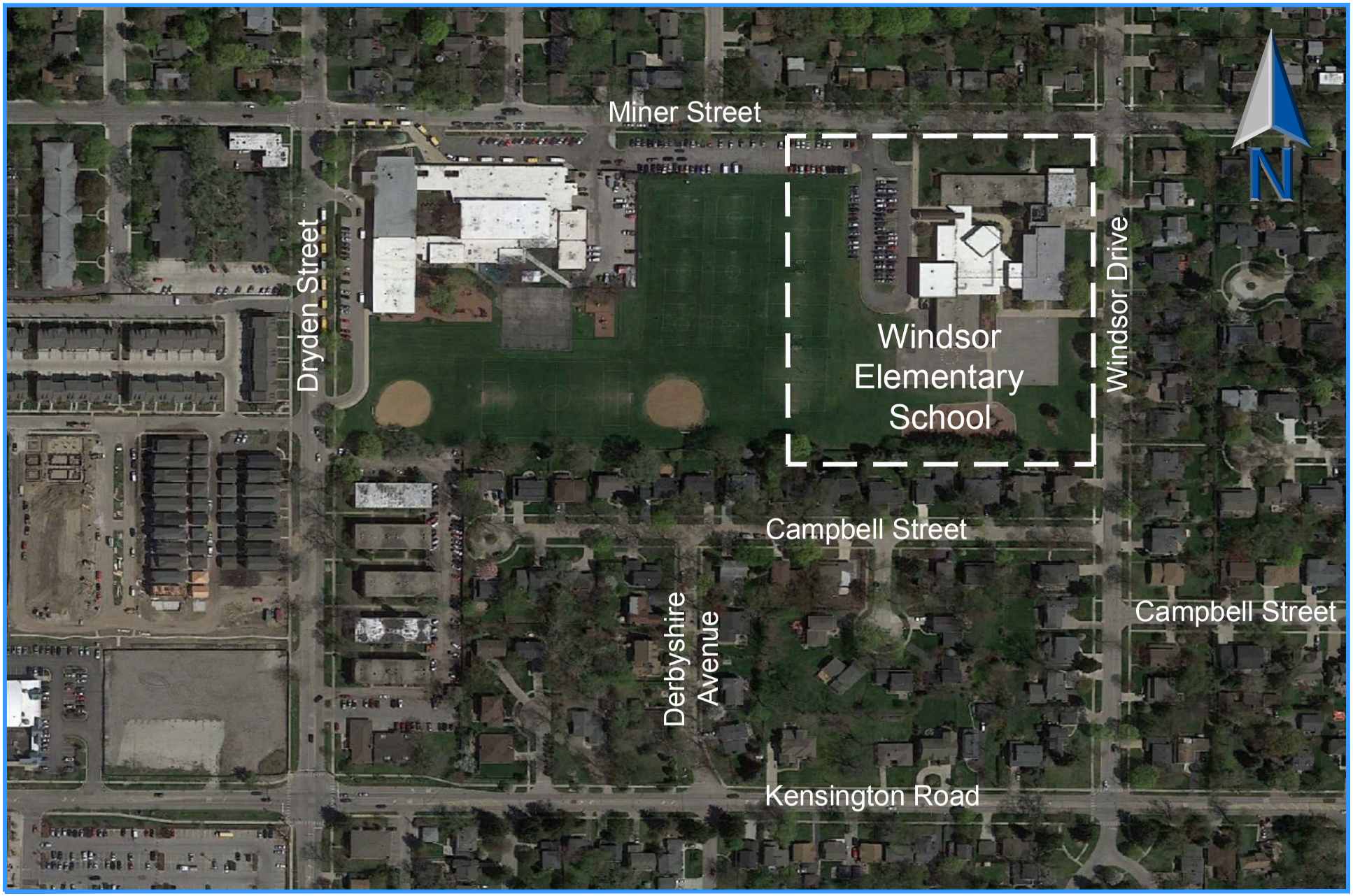
The remaining east-west parking lot for Minor School would have 46 spaces with 30 parked vehicles leaving 16 open spaces for additional off-street parking for either school to use.

Parking for special events at the school can be accommodated by a combination of the off-street parking, shared parking at Miner School, and on-street parking by the school.

SUMMARY

This report summarizes the results of traffic and parking study for the expansion of Windsor Elementary School in Arlington Heights, Illinois. The following recommendations were developed:

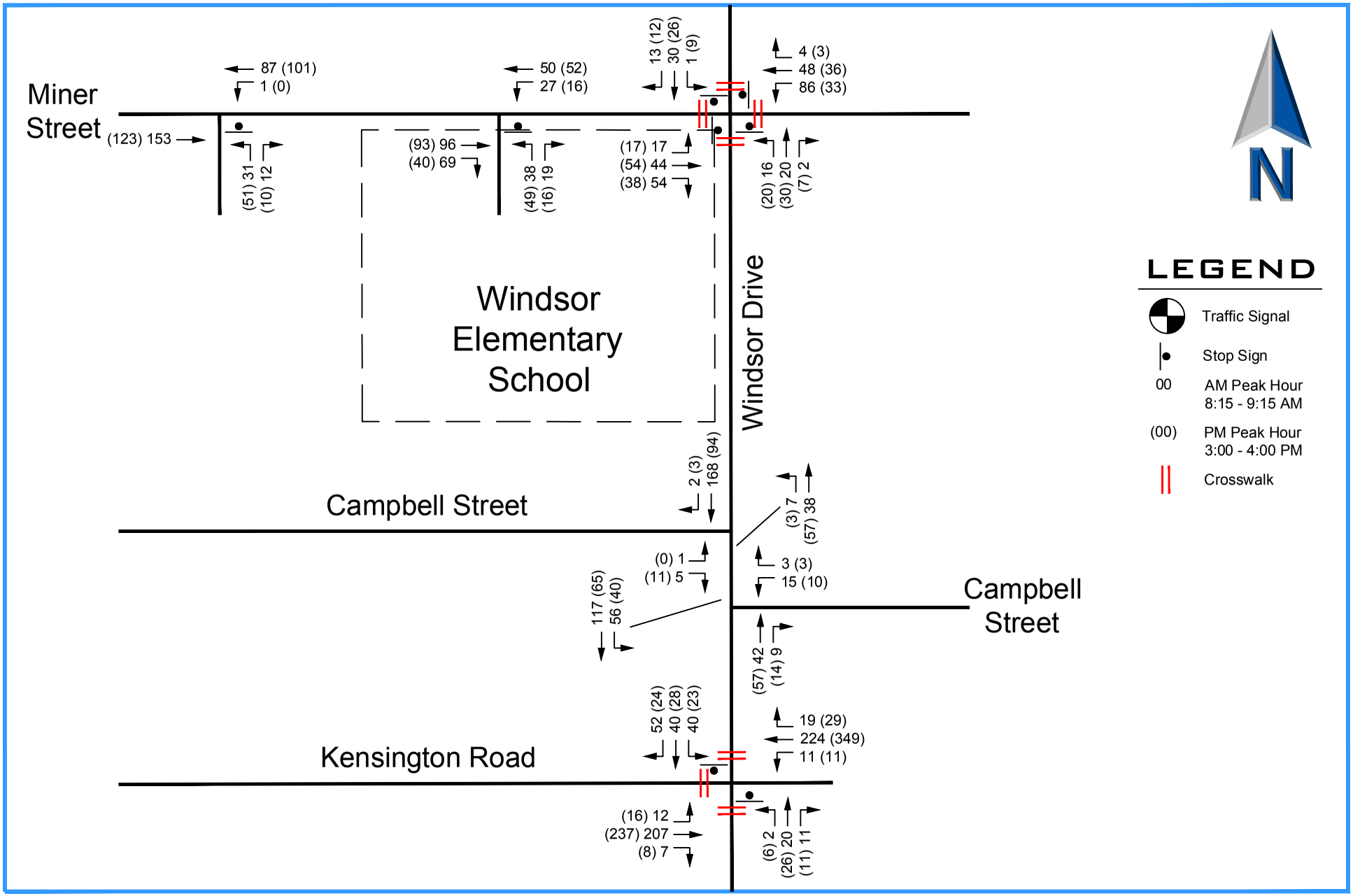
1. The morning restriction of northbound traffic on Windsor Drive between Campbell Street (West) and Miner Street, when reinforced by traffic cones, was effective in preventing traffic from going north past the school.
2. It is recommended that the northbound restriction be extended to the afternoon dismissal period (3:15 – 4:00 PM) to eliminate the opportunity for parents from improperly and unsafely picking up their kids by the school.
3. The west parking lot will be redesigned to accommodate 101 spaces with separate inbound and outbound access drives on Miner Street. This includes 5 required accessible parking spaces.
4. Parking counts at the school show that the 101 proposed parking spaces will serve the needs of the expanded school and a parking variation of 121 spaces would be required from the 222 spaces required by code.
5. Parking counts at the adjacent Miner School parking lot indicate that 16 empty parking spaces are available for either school to use when the expansion is completed.
6. A land banked parking plan with 19 additional spaces has been provided in case additional parking is needed in the future.
7. Parking restrictions should be considered on the east side of Windsor Drive, north of Miner Street, and on the north side of Miner Street, east of Windsor Drive Both sections would be approximately 250 feet long and the restriction would only apply to school days for designated hours.
8. The proposed school loading plan would allow additional students to use the west parking lot to spread out loading demand around the school. Approximately 225 students would be allowed to use the lot based on their grade level or home geography (to be determined). The overall demand along Windsor Drive would drop with this redistribution of school traffic.
9. As part of Item 8, school officials will review the number and location of staff and volunteers to assist in the loading of students in the west lot and along Windsor Drive and make adjustments as needed.



ERIKSSON ENGINEERING ASSOCIATES, LTD.

Site Location and Area Roadways

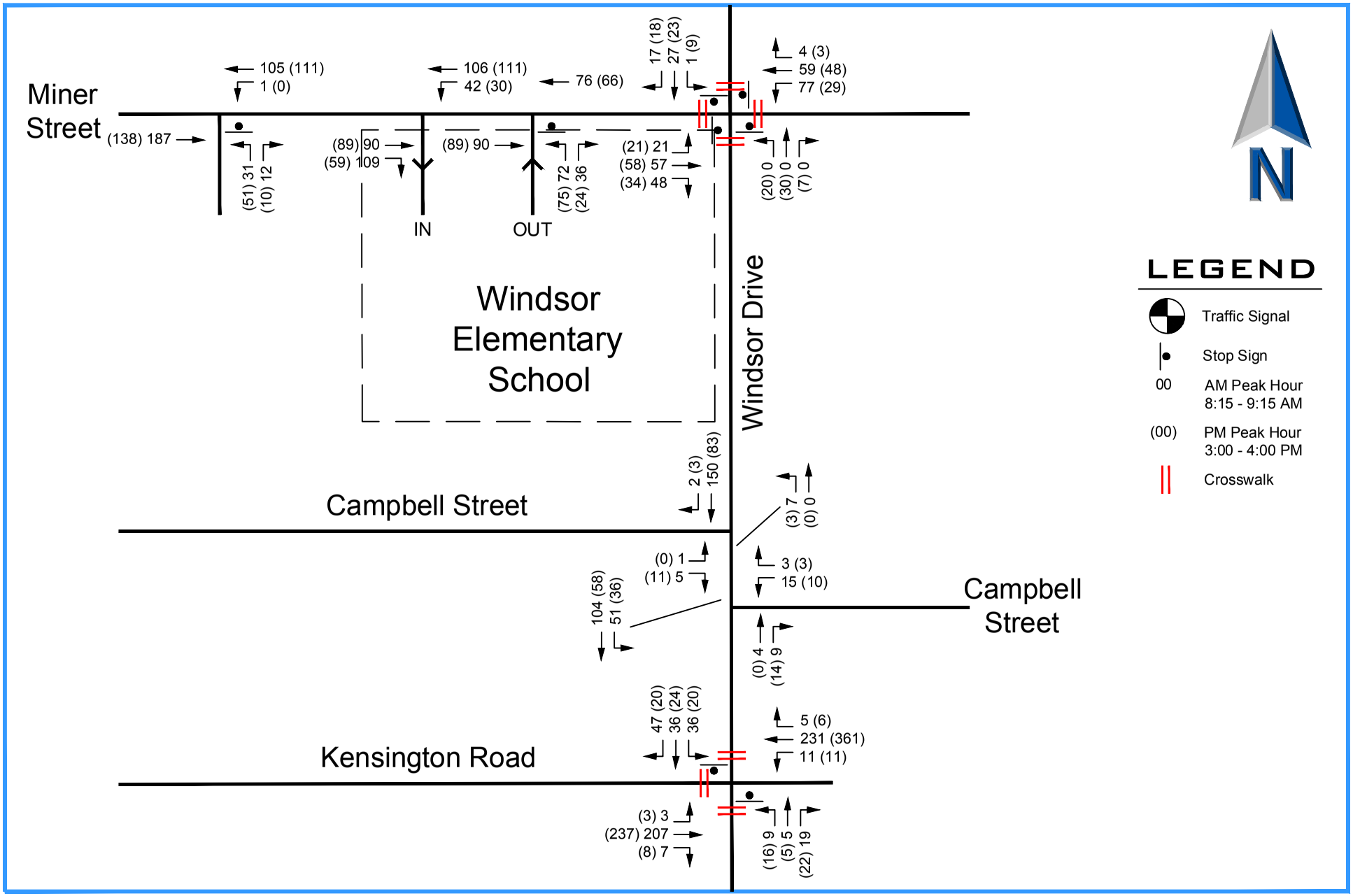
Figure 1



ERIKSSON ENGINEERING ASSOCIATES, LTD.

Existing Traffic Volumes

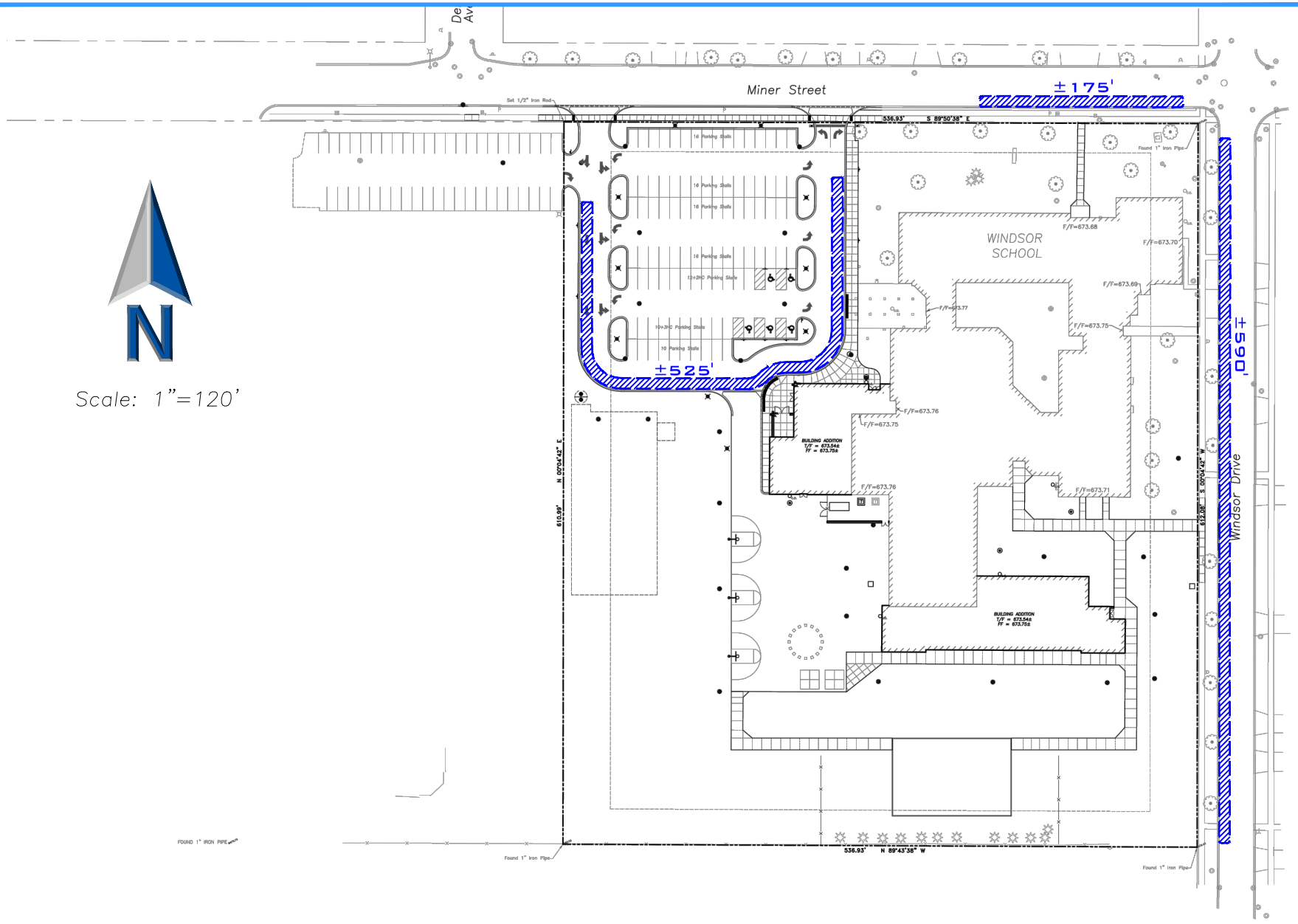
Figure 2



ERIKSSON ENGINEERING ASSOCIATES, LTD.

Total Traffic Volumes

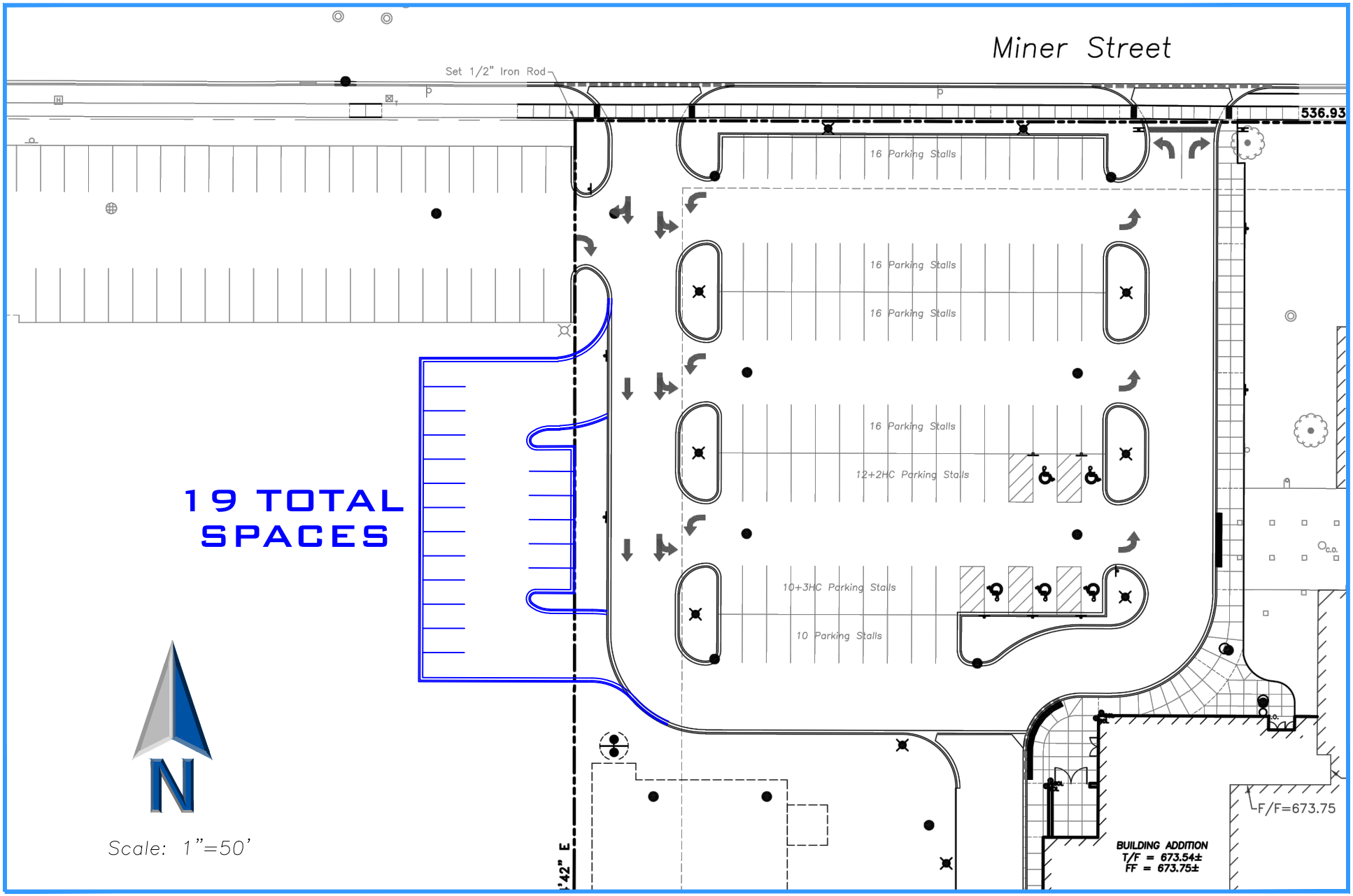
Figure 3



ERIKSSON ENGINEERING ASSOCIATES, LTD.

School Loading Zones

Figure 4



ERIKSSON ENGINEERING ASSOCIATES, LTD.

Parking Land Bank

Figure 5

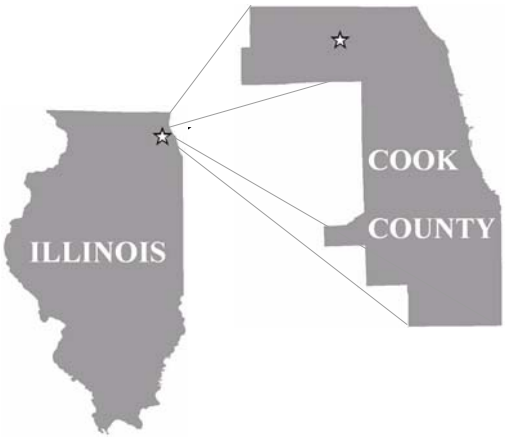
Appendix

- School Boundary Map
- 2016 Total Counts
- Capacity Analyses

ELEMENTARY SCHOOL DISTRICTS

Village of Arlington Heights

Cook County - Illinois



Legend

VAH Elementary Schools

ELEMENTARY SCHOOL DISTRICTS

- Dryden School
- Fairview School
- Forest View School
- Greenbrier School
- Ivy Hill School
- Juliette Low School
- Lake Louise School
- Longfellow School
- Olive Mary Stitt School
- Patton School
- Poe School
- Riley School
- Sullivan School
- Westgate School
- Willow Bend School
- Windsor School
- Winston School

ELEMENTARY SCHOOL BOUNDARIES 2008

STREETS

Feature Class Type

- Interstate Highway
- US and State Highway
- Major Streets
- Local City Streets

N

Scale 1:52,300

1 inch equals 0.83 miles

Miles 0 0.35 0.7 1.4

Feet 0 1,750 3,500 7,000

Data Sources:
1. Planimetric Data - Cook County, IL (2001) - VAH GIS Div. (rev. 2004)
2. Annotation - VAH GIS Div. (2004)

Projection: State Plane Coordinate System (Illinois East)
Datum: NAD83 Map Units: feet

MAP PREPARED BY:
VILLAGE OF ARLINGTON HEIGHTS
GEOGRAPHIC INFORMATION SYSTEMS DIVISION
33 S. ARLINGTON HTS. RD.
ARLINGTON HEIGHTS, IL 60005
(847) 368-5726
http://www.vah.com

APRIL 2008

Intersection Counts
Miner Street at Windsor Drive

Arlington Heights, Illinois

ERIKSSON ENGINEERING ASSOCIATES, LTD.

Begin Time	Windsor Drive Southbound			Miner Street Westbound			Windsor Drive Northbound			Miner Street Eastbound			15 Minute Totals	60 Minute Totals	Peak Hour Factor	Pedestrian and Bicycle Counts							
	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn				North Leg		East Leg		South Leg		West Leg	
																Ped.	Bike	Ped.	Bike	Ped.	Bike	Ped.	Bike
	Tuesday May 17, 2016																						
8:00 AM	4	5	0	2	14	0	0	3	6	5	4	6	49	314	0.60	0	0	0	0	0	0	2	0
8:15 AM	4	9	0	1	17	3	0	4	3	3	8	2	54	**322**	**0.61**	1	0	3	0	0	0	1	0
8:30 AM	4	5	0	0	12	21	1	2	5	14	10	6	80	300	0.57	7	0	1	0	8	0	26	0
8:45 AM	1	7	1	1	11	59	0	1	6	32	7	5	131			7	0	0	0	8	1	38	0
9:00 AM	4	9	0	2	8	3	1	6	2	5	13	4	57			0	0	0	1	3	0	0	0
9:15 AM	0	2	0	0	12	1	1	5	2	5	4	0	32			1	0	1	0	0	0	0	0
Total	17	37	1	6	74	87	3	21	24	64	46	23				16	0	5	1	19	1	67	0
8:15-9:15 AM	**13**	**30**	**1**	**4**	**48**	**86**	**2**	**13**	**16**	**54**	**38**	**17**	**322**			**15**	**0**	**4**	**1**	**19**	**1**	**65**	**0**
	Tuesday May 17, 2016																						
3:00 PM	3	3	1	2	7	14	2	12	6	9	11	7	77	**299**	**0.82**	1	0	1	0	0	0	0	0
3:15 PM	5	9	5	1	9	7	1	6	9	7	14	3	76	287	0.79	0	0	3	1	3	0	9	0
3:30 PM	2	10	2	1	8	11	3	14	3	13	19	5	91	279	0.77	12	1	1	0	50	0	62	0
3:45 PM	2	4	1	0	12	1	1	5	2	9	16	2	55			0	0	3	0	2	0	5	0
4:00 PM	5	6	2	1	8	2	0	10	5	9	13	4	65			1	0	1	0	0	0	7	0
4:15 PM	4	7	0	0	13	0	1	10	5	3	24	1	68			1	0	1	0	5	0	1	1
Total	21	39	11	5	57	35	8	57	30	50	97	22				15	1	10	1	60	0	84	1
3:00-4:00 PM	**12**	**26**	**9**	**4**	**36**	**33**	**7**	**37**	**20**	**38**	**60**	**17**	**299**			**13**	**1**	**8**	**1**	**55**	**0**	**76**	**0**

Intersection Counts
Campbell Street at Windsor Drive

Arlington Heights, Illinois

Begin Time	Windsor Drive Southbound		Campbell Street Westbound		Windsor Drive Northbound		Cambell Street Eastbound		15 Minute Totals	60 Minute Totals	Peak Hour Factor	North Leg	East Leg		South Leg	West Leg	
	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn	Right Turn	Left Turn				Bike	Ped.	Bike	Bike	Ped.	Bike
	Thursday May 19, 2016																
8:00 AM	0	1	0	5	1	0	0	0	7	91	0.44	0	0	0	0	0	0
8:15 AM	0	1	0	5	2	0	1	1	10	**98**	**0.47**	0	0	0	0	0	0
8:30 AM	0	13	2	1	2	3	1	0	22	93	0.45	0	0	0	2	11	1
8:45 AM	2	36	1	4	4	4	1	0	52			3	8	0	3	61	0
9:00 AM	0	6	0	5	1	0	2	0	14			0	1	0	0	1	0
9:15 AM	0	2	1	0	1	0	1	0	5			0	0	0	0	0	0
Total	2	59	4	20	11	7	6	1				3	9	0	5	73	1
8:15-9:15 AM	**2**	**56**	**3**	**15**	**9**	**7**	**5**	**1**	**98**			**3**	**9**	**0**	**5**	**73**	**1**
	Thursday May 19, 2016																
3:00 PM	0	2	1	3	2	2	3	0	13	**84**	**0.42**	0	0	0	0	3	0
3:15 PM	0	2	1	3	3	1	0	0	10	84	0.42	1	4	0	0	10	0
3:30 PM	1	35	0	2	7	0	5	0	50	81	0.41	4	0	0	0	47	0
3:45 PM	2	1	1	2	2	0	3	0	11			0	2	1	0	6	0
4:00 PM	0	4	3	1	2	2	0	1	13			0	3	0	0	7	0
4:15 PM	0	4	0	1	2	0	0	0	7			0	1	0	0	16	0
Total	3	48	6	12	18	5	11	1				5	10	1	0	89	0
3:00-4:00 PM	**3**	**40**	**3**	**10**	**14**	**3**	**11**	**0**	**84**			**5**	**6**	**1**	**0**	**66**	**0**

Intersection Counts
Kensington Road at Windsor Drive

Arlington Heights, Illinois

ERIKSSON ENGINEERING ASSOCIATES, LTD.

Begin Time	Windsor Drive Southbound			Kensington Road Westbound			Windsor Drive Northbound			Kensington Road Eastbound			15 Minute Totals	60 Minute Totals	Peak Hour Factor	Pedestrian and Bicycle Counts							
																North Leg		East Leg		South Leg		West Leg	
	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn	Right Turn	Through	Left Turn				Ped.	Bike	Ped.	Bike	Ped.	Bike	Ped.	Bike
	Thursday May 19, 2016																						
8:00 AM	5	9	4	2	63	1	3	4	2	6	47	1	147	621	0.69	0	0	1	0	2	0	0	0
8:15 AM	6	12	3	5	50	4	0	4	2	1	51	5	143	**641**	**0.72**	2	0	0	0	2	0	0	0
8:30 AM	6	6	2	1	40	1	2	9	0	2	36	2	107	671	0.75	0	0	0	0	11	0	26	0
8:45 AM	35	12	23	7	66	1	6	5	0	3	62	4	224			8	0	0	0	19	0	35	0
9:00 AM	5	6	12	6	68	5	3	2	0	1	58	1	167			2	0	2	0	3	0	7	0
9:15 AM	1	3	10	6	72	4	6	6	2	0	61	2	173			0	0	0	0	2	0	0	0
Total	58	48	54	27	359	16	20	30	6	13	315	15				12	0	3	0	39	0	68	0
8:15-9:15 AM	**52**	**36**	**40**	**19**	**224**	**11**	**11**	**20**	**2**	**7**	**207**	**12**	**641**			**12**	**0**	**2**	**0**	**35**	**0**	**68**	**0**
	Thursday May 19, 2016																						
3:00 PM	2	8	5	9	103	7	3	8	1	2	67	1	216	**764**	**0.88**	3	0	1	0	7	0	3	0
3:15 PM	5	2	5	11	89	2	3	6	0	0	55	3	181	743	0.95	2	1	1	0	5	0	6	0
3:30 PM	11	9	9	7	88	0	1	7	2	1	54	7	196	762	0.95	7	0	0	0	18	0	43	0
3:45 PM	6	5	4	2	69	2	4	5	3	5	61	5	171			3	0	1	1	6	0	5	0
4:00 PM	6	10	6	7	85	1	2	9	1	2	62	4	195			0	0	3	0	3	0	6	0
4:15 PM	7	8	2	3	78	1	3	11	0	1	81	5	200			1	0	1	0	6	0	16	0
Total	37	42	31	39	512	13	16	46	7	11	380	25				16	1	7	1	45	0	79	0
3:00-4:00 PM	**24**	**24**	**23**	**29**	**349**	**11**	**11**	**26**	**6**	**8**	**237**	**16**	**764**			**15**	**1**	**3**	**1**	**36**	**0**	**57**	**0**

Intersection Counts
Miner Street at Windsor School Drive

Arlington Heights, Illinois

ERIKSSON ENGINEERING ASSOCIATES, LTD.

Begin Time	Miner Street Westbound Left Turn	Windsor Driveway Northbound Right Turn	Windsor Driveway Northbound Left Turn	Miner Street Eastbound Right Turn	15 Minute Totals	60 Minute Totals	Peak Hour Factor	Pedestrian and Bicycle Counts East Leg Bike	Pedestrian and Bicycle Counts South Leg Ped.	Pedestrian and Bicycle Counts West Leg Bike
	Tuesday May 17, 2016									
8:00 AM	15	3	3	39	60	177	0.74	0	1	0
8:15 AM	9	3	4	21	37	**153**	**0.75**	0	1	0
8:30 AM	7	4	3	15	29	125	0.61	1	2	0
8:45 AM	7	8	15	21	51			1	2	0
9:00 AM	4	4	16	12	36			0	7	0
9:15 AM	1	1	3	4	9			0	1	0
Total	43	23	44	112				2	14	0
8:15-9:15 AM	**27**	**19**	**38**	**69**	**153**			**2**	**12**	**0**
3:00 PM	4	4	0	6	14	**121**	**0.69**	0	0	0
3:15 PM	9	3	5	13	30	137	0.78	0	1	0
3:30 PM	0	1	24	8	33	130	0.74	0	42	0
3:45 PM	3	8	20	13	44			0	4	0
4:00 PM	3	7	6	14	30			0	1	0
4:15 PM	4	1	3	15	23			0	3	1
Total	23	24	58	69				0	51	1
3:00-4:00 PM	**16**	**16**	**49**	**40**	**121**			**0**	**47**	**0**

Intersection Counts

Miner Street at Shared Access Drive Arlington Heights, Illinois

Begin Time	Miner Street Westbound Left Turn	Windsor Drive Northbound Right Turn	Windsor Drive Northbound Left Turn	15 Minute Totals	60 Minute Totals	Peak Hour Factor	Pedestrian and Bicycle Counts East Leg Bike	Pedestrian and Bicycle Counts South Leg Ped.	Pedestrian and Bicycle Counts West Leg Bike
	Tuesday May 17, 2016								
8:00 AM	0	8	15	23	57	0.62	0	0	0
8:15 AM	0	1	12	13	**44**	**0.79**	0	2	0
8:30 AM	0	3	4	7	34	0.61	1	5	0
8:45 AM	0	4	10	14			1	0	0
9:00 AM	1	4	5	10			0	2	0
9:15 AM	0	0	3	3			0	1	0
Total	1	20	49				2	10	0
8:15-9:15 AM	**1**	**12**	**31**	**44**			**2**	**9**	**0**
3:00 PM	0	2	17	19	**61**	**0.61**	0	0	0
3:15 PM	0	3	3	6	47	0.47	0	1	0
3:30 PM	0	4	21	25	45	0.45	0	30	0
3:45 PM	0	1	10	11			0	4	0
4:00 PM	0	2	3	5			0	1	0
4:15 PM	1	0	3	4			0	0	1
Total	1	12	57				0	36	1
3:00-4:00 PM	**0**	**10**	**51**	**61**			**0**	**35**	**0**

HCS7 Two-Way Stop-Control Report

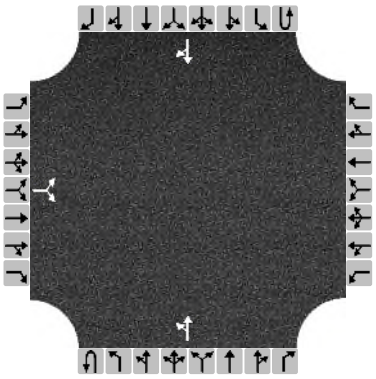
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.47
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		1		5						7	0				150	2
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		7.13		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			13							15						
Capacity, c (veh/h)			587							1077						
v/c Ratio			0.02							0.01						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			11.3							8.4						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		11.3								8.4						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

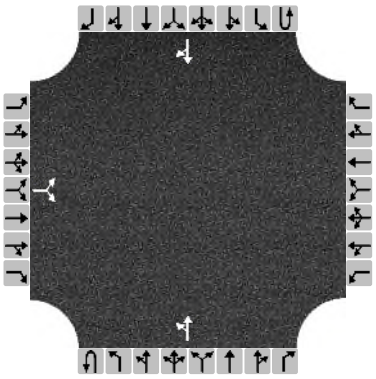
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.42
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		0		11						3	0				83	3
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		7.13		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			26							7						
Capacity, c (veh/h)			715							1197						
v/c Ratio			0.04							0.01						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			10.2							8.0						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		10.2								8.0						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

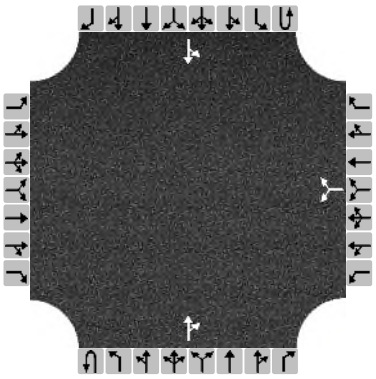
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.47
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						15		3			4	9		51	104	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						7.13		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							38							109		
Capacity, c (veh/h)							515							1553		
v/c Ratio							0.07							0.07		
95% Queue Length, Q_{95} (veh)							0.2							0.2		
Control Delay (s/veh)							12.5							7.5		
Level of Service, LOS							B							A		
Approach Delay (s/veh)						12.5								2.9		
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

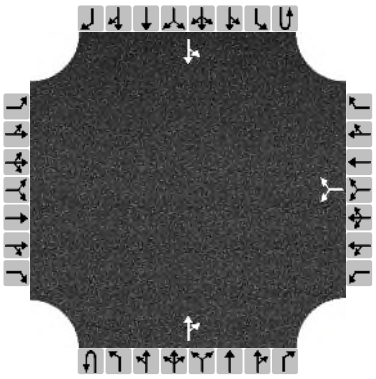
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.42
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						10		3			0	14		36	58	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						7.13		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							31							86		
Capacity, c (veh/h)							651							1551		
v/c Ratio							0.05							0.06		
95% Queue Length, Q_{95} (veh)							0.1							0.2		
Control Delay (s/veh)							10.8							7.5		
Level of Service, LOS							B							A		
Approach Delay (s/veh)						10.8								3.1		
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

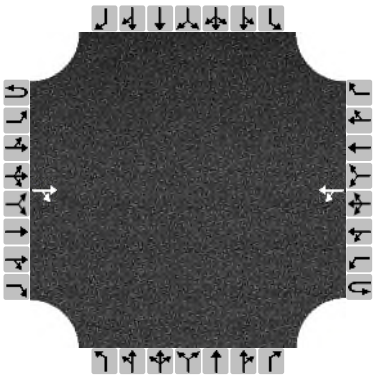
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Inbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Inbound Driveway
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT										
Volume, V (veh/h)			90	109		42	106									
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1										
Critical Headway (sec)						4.13										
Base Follow-Up Headway (sec)						2.2										
Follow-Up Headway (sec)						2.23										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						56										
Capacity, c (veh/h)						1237										
v/c Ratio						0.05										
95% Queue Length, Q_{95} (veh)						0.1										
Control Delay (s/veh)						8.0										
Level of Service, LOS						A										
Approach Delay (s/veh)						2.6										
Approach LOS																

HCS7 Two-Way Stop-Control Report

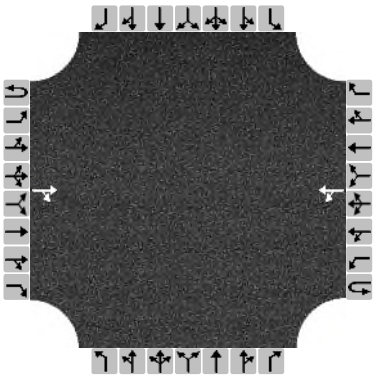
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Inbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Inbound Driveway
Peak Hour Factor	0.69
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT										
Volume, V (veh/h)			98	59		30	111									
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1										
Critical Headway (sec)						4.13										
Base Follow-Up Headway (sec)						2.2										
Follow-Up Headway (sec)						2.23										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						43										
Capacity, c (veh/h)						1239										
v/c Ratio						0.03										
95% Queue Length, Q_{95} (veh)						0.1										
Control Delay (s/veh)						8.0										
Level of Service, LOS						A										
Approach Delay (s/veh)					1.9											
Approach LOS																

HCS7 Two-Way Stop-Control Report

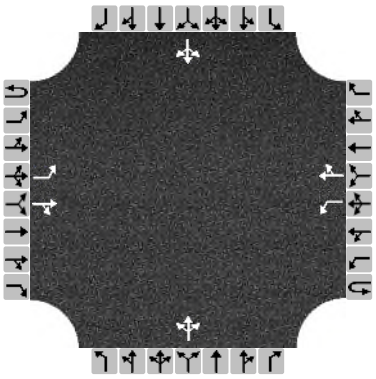
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Kensington/Windsor
Jurisdiction	Arlington Heights
East/West Street	Kensington Road
North/South Street	Windsor Drive
Peak Hour Factor	0.72
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume, V (veh/h)		3	207	7		11	231	5		9	5	19		36	36	47
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4				15					45				165	
Capacity, c (veh/h)		1201				1180					400				406	
v/c Ratio		0.00				0.01					0.11				0.41	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				1.9	
Control Delay (s/veh)		8.0				8.1					15.1				19.8	
Level of Service, LOS		A				A					C				C	
Approach Delay (s/veh)		0.1				0.4				15.1				19.8		
Approach LOS										C				C		

HCS7 Two-Way Stop-Control Report

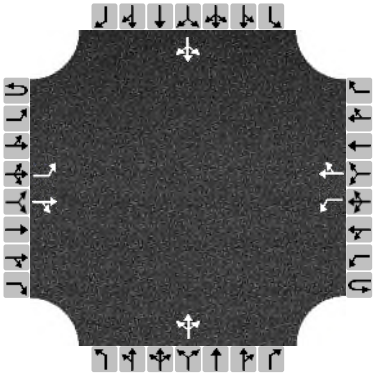
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Kensington/Windsor
Jurisdiction	Arlington Heights
East/West Street	Kensington Road
North/South Street	Windsor Drive
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume, V (veh/h)		3	237	8		11	361	6		16	5	22		20	24	20
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		3				12					49				73	
Capacity, c (veh/h)		1110				1199					381				356	
v/c Ratio		0.00				0.01					0.13				0.21	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				0.8	
Control Delay (s/veh)		8.3				8.0					15.8				17.7	
Level of Service, LOS		A				A					C				C	
Approach Delay (s/veh)		0.1				0.2				15.8				17.7		
Approach LOS										C				C		

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*AJB*
Agency/Co.	*Eriksson Engineering*
Date Performed	*01/31/2017*
Analysis Time Period	*8:15 - 9:15 AM*

Site Information

Intersection	*Miner/Windsor*
Jurisdiction	*Arlington Heights*
Analysis Year	*2016*

Project ID *Proposed Conditions*

East/West Street: *Miner Street* | North/South Street: *Windsor Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*21*	*57*	*48*	*77*	*59*	*4*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*1*	*27*	*17*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.61*		*0.61*		*0.61*		*0.61*	
Flow Rate (veh/h)	*205*		*228*		*0*		*72*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.6*		*0.0*		*0.0*	
Prop. Right-Turns	*0.4*		*0.0*		*0.0*		*0.4*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.2*		*0.1*		*0.0*		*-0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.18*		*0.20*		*0.00*		*0.06*	
hd, final value (s)	*4.12*		*4.38*		*4.95*		*4.62*	
x, final value	*0.235*		*0.277*		*0.000*		*0.092*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.1*		*2.4*		*3.0*		*2.6*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*891*		*814*				*800*	
Delay (s/veh)	*8.4*		*9.0*		*8.0*		*8.1*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*8.4*		*9.0*		*8.0*		*8.1*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.6*							
Intersection LOS	*A*							

HCS+™ Version 5.6 Generated: 1/31/2017 2:46 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*AJB*
Agency/Co.	*Eriksson Engineering*
Date Performed	*01/31/2017*
Analysis Time Period	*3:00 - 4:00 PM*

Site Information

Intersection	*Miner/Windsor*
Jurisdiction	*Arlington Heights*
Analysis Year	*2016*

Project ID *Proposed Conditions*

East/West Street: *Miner Street* | North/South Street: *Windsor Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*21*	*58*	*34*	*29*	*48*	*3*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*20*	*30*	*7*	*9*	*23*	*18*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.82*		*0.82*		*0.82*		*0.82*	
Flow Rate (veh/h)	*136*		*96*		*68*		*59*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.4*		*0.4*		*0.2*	
Prop. Right-Turns	*0.3*		*0.0*		*0.1*		*0.4*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.0*		*-0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.12*		*0.09*		*0.06*		*0.05*	
hd, final value (s)	*4.16*		*4.39*		*4.49*		*4.32*	
x, final value	*0.157*		*0.117*		*0.085*		*0.071*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.2*		*2.4*		*2.5*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*850*		*800*		*850*		*843*	
Delay (s/veh)	*7.9*		*8.0*		*7.9*		*7.6*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.9*		*8.0*		*7.9*		*7.6*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.9*							
Intersection LOS	*A*							

HCS+™ Version 5.6 Generated: 1/31/2017 2:47 PM

HCS7 Two-Way Stop-Control Report

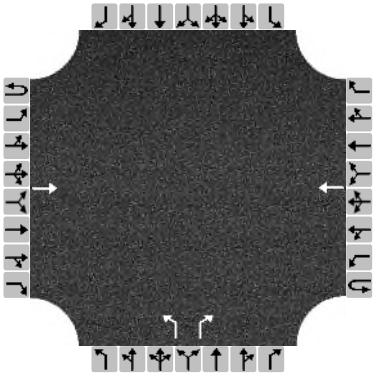
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Outbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Outbound Driveway
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume, V (veh/h)			90				76			72		36				
Percent Heavy Vehicles (%)										3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										7.13		6.23				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										96		48				
Capacity, c (veh/h)										695		884				
v/c Ratio										0.14		0.05				
95% Queue Length, Q_{95} (veh)										0.5		0.2				
Control Delay (s/veh)										11.0		9.3				
Level of Service, LOS										B		A				
Approach Delay (s/veh)										10.4						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

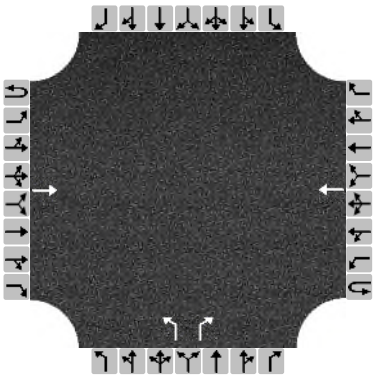
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Outbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Outbound Driveway
Peak Hour Factor	0.69
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume, V (veh/h)			89				66			75		24				
Percent Heavy Vehicles (%)										3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										7.13		6.23				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										109		35				
Capacity, c (veh/h)										655		835				
v/c Ratio										0.17		0.04				
95% Queue Length, Q_{95} (veh)										0.6		0.1				
Control Delay (s/veh)										11.6		9.5				
Level of Service, LOS										B		A				
Approach Delay (s/veh)										11.1						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

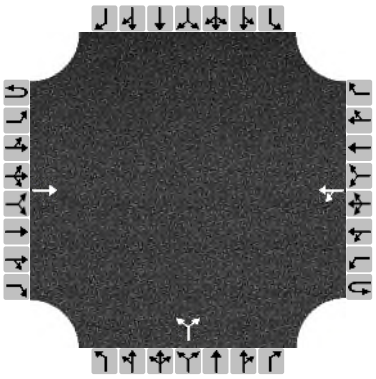
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Shared Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	Shared Driveway
Peak Hour Factor	0.79
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration			T			LT					LR					
Volume, V (veh/h)			187			1	105			31		12				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				7.13		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						1					54					
Capacity, c (veh/h)						1270					601					
v/c Ratio						0.00					0.09					
95% Queue Length, Q_{95} (veh)						0.0					0.3					
Control Delay (s/veh)						7.8					11.6					
Level of Service, LOS						A					B					
Approach Delay (s/veh)						0.1					11.6					
Approach LOS											B					

HCS7 Two-Way Stop-Control Report

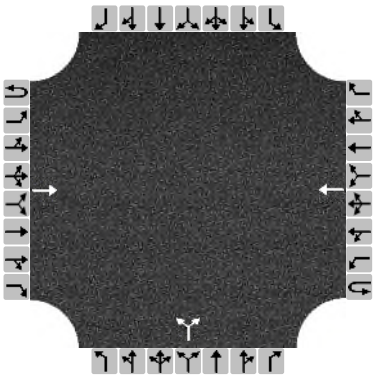
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Shared Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	Shared Driveway
Peak Hour Factor	0.61
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration			T				T				LR					
Volume, V (veh/h)			138				111			51		10				
Percent Heavy Vehicles (%)										3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										7.13		6.23				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)											100					
Capacity, c (veh/h)											533					
v/c Ratio											0.19					
95% Queue Length, Q_{95} (veh)											0.7					
Control Delay (s/veh)											13.3					
Level of Service, LOS											B					
Approach Delay (s/veh)										13.3						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

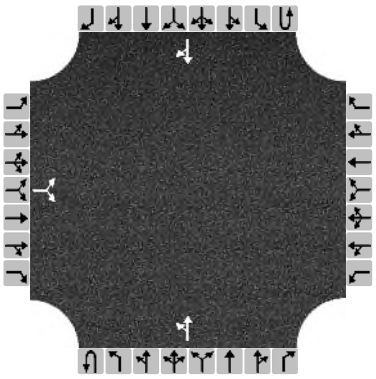
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.47
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		1		5						7	0				150	2
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		7.13		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			13							15						
Capacity, c (veh/h)			587							1077						
v/c Ratio			0.02							0.01						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			11.3							8.4						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		11.3								8.4						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

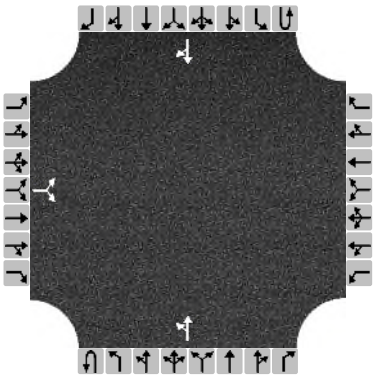
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.42
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume, V (veh/h)		0		11						3	0				83	3
Percent Heavy Vehicles (%)		3		3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		7.13		6.23						4.13						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.23						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			26							7						
Capacity, c (veh/h)			715							1197						
v/c Ratio			0.04							0.01						
95% Queue Length, Q_{95} (veh)			0.1							0.0						
Control Delay (s/veh)			10.2							8.0						
Level of Service, LOS			B							A						
Approach Delay (s/veh)		10.2								8.0						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

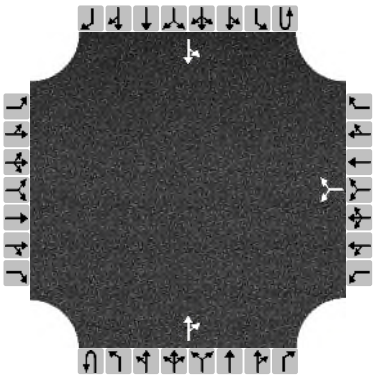
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.47
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						15		3			4	9		51	104	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						7.13		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							38							109		
Capacity, c (veh/h)							515							1553		
v/c Ratio							0.07							0.07		
95% Queue Length, Q_{95} (veh)							0.2							0.2		
Control Delay (s/veh)							12.5							7.5		
Level of Service, LOS							B							A		
Approach Delay (s/veh)						12.5								2.9		
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

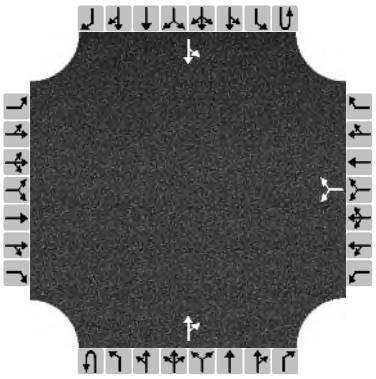
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	North-South
Project Description	Proposed Conditions

Site Information

Intersection	Windsor/Campbell
Jurisdiction	Arlington Heights
East/West Street	Campbell Street
North/South Street	Windsor Drive
Peak Hour Factor	0.42
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	0	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume, V (veh/h)						10		3			0	14		36	58	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						7.13		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							31							86		
Capacity, c (veh/h)							651							1551		
v/c Ratio							0.05							0.06		
95% Queue Length, Q_{95} (veh)							0.1							0.2		
Control Delay (s/veh)							10.8							7.5		
Level of Service, LOS							B							A		
Approach Delay (s/veh)						10.8								3.1		
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

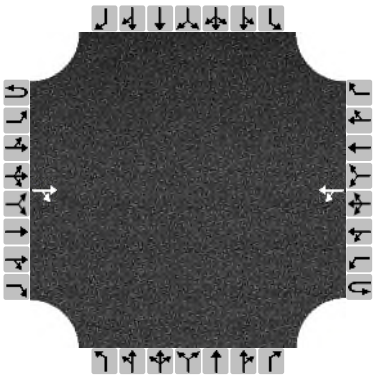
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Inbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Inbound Driveway
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT										
Volume, V (veh/h)			90	109		42	106									
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1										
Critical Headway (sec)						4.13										
Base Follow-Up Headway (sec)						2.2										
Follow-Up Headway (sec)						2.23										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						56										
Capacity, c (veh/h)						1237										
v/c Ratio						0.05										
95% Queue Length, Q_{95} (veh)						0.1										
Control Delay (s/veh)						8.0										
Level of Service, LOS						A										
Approach Delay (s/veh)						2.6										
Approach LOS																

HCS7 Two-Way Stop-Control Report

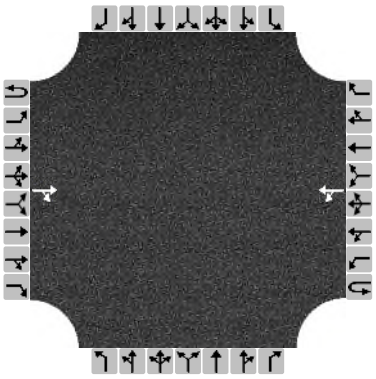
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Inbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Inbound Driveway
Peak Hour Factor	0.69
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration				TR		LT										
Volume, V (veh/h)			98	59		30	111									
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)																
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1										
Critical Headway (sec)						4.13										
Base Follow-Up Headway (sec)						2.2										
Follow-Up Headway (sec)						2.23										

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						43										
Capacity, c (veh/h)						1239										
v/c Ratio						0.03										
95% Queue Length, Q_{95} (veh)						0.1										
Control Delay (s/veh)						8.0										
Level of Service, LOS						A										
Approach Delay (s/veh)					1.9											
Approach LOS																

HCS7 Two-Way Stop-Control Report

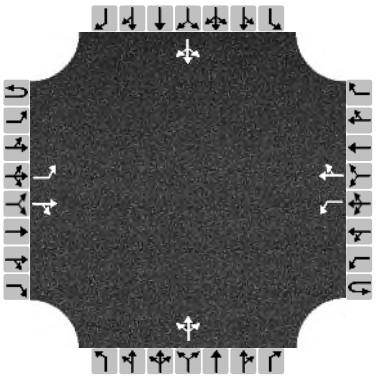
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Kensington/Windsor
Jurisdiction	Arlington Heights
East/West Street	Kensington Road
North/South Street	Windsor Drive
Peak Hour Factor	0.72
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume, V (veh/h)		3	207	7		11	231	5		9	5	19		36	36	47
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		4				15					45				165	
Capacity, c (veh/h)		1201				1180					400				406	
v/c Ratio		0.00				0.01					0.11				0.41	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				1.9	
Control Delay (s/veh)		8.0				8.1					15.1				19.8	
Level of Service, LOS		A				A					C				C	
Approach Delay (s/veh)		0.1				0.4				15.1				19.8		
Approach LOS										C				C		

HCS7 Two-Way Stop-Control Report

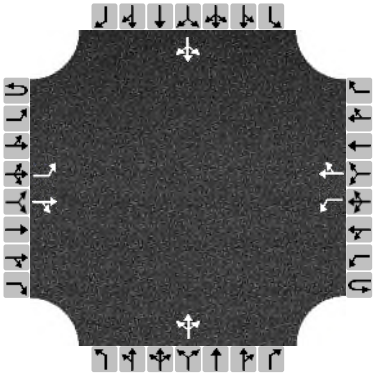
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Kensington/Windsor
Jurisdiction	Arlington Heights
East/West Street	Kensington Road
North/South Street	Windsor Drive
Peak Hour Factor	0.88
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	1	0	0	1	1	0		0	1	0		0	1	0
Configuration		L		TR		L		TR			LTR				LTR	
Volume, V (veh/h)		3	237	8		11	361	6		16	5	22		20	24	20
Percent Heavy Vehicles (%)		3				3				3	3	3		3	3	3
Proportion Time Blocked																
Percent Grade (%)										0				0		
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1				4.1				7.1	6.5	6.2		7.1	6.5	6.2
Critical Headway (sec)		4.13				4.13				7.13	6.53	6.23		7.13	6.53	6.23
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.23				2.23				3.53	4.03	3.33		3.53	4.03	3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		3				12					49				73	
Capacity, c (veh/h)		1110				1199					381				356	
v/c Ratio		0.00				0.01					0.13				0.21	
95% Queue Length, Q_{95} (veh)		0.0				0.0					0.4				0.8	
Control Delay (s/veh)		8.3				8.0					15.8				17.7	
Level of Service, LOS		A				A					C				C	
Approach Delay (s/veh)		0.1				0.2				15.8				17.7		
Approach LOS										C				C		

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*AJB*
Agency/Co.	*Eriksson Engineering*
Date Performed	*01/31/2017*
Analysis Time Period	*8:15 - 9:15 AM*

Site Information

Intersection	*Miner/Windsor*
Jurisdiction	*Arlington Heights*
Analysis Year	*2016*

Project ID *Proposed Conditions*

East/West Street: *Miner Street* | North/South Street: *Windsor Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*21*	*57*	*48*	*77*	*59*	*4*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*1*	*27*	*17*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.61*		*0.61*		*0.61*		*0.61*	
Flow Rate (veh/h)	*205*		*228*		*0*		*72*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.6*		*0.0*		*0.0*	
Prop. Right-Turns	*0.4*		*0.0*		*0.0*		*0.4*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.2*		*0.1*		*0.0*		*-0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.18*		*0.20*		*0.00*		*0.06*	
hd, final value (s)	*4.12*		*4.38*		*4.95*		*4.62*	
x, final value	*0.235*		*0.277*		*0.000*		*0.092*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.1*		*2.4*		*3.0*		*2.6*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*891*		*814*				*800*	
Delay (s/veh)	*8.4*		*9.0*		*8.0*		*8.1*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*8.4*		*9.0*		*8.0*		*8.1*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*8.6*							
Intersection LOS	*A*							

HCS+™ Version 5.6 Generated: 1/31/2017 2:46 PM

ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	*AJB*
Agency/Co.	*Eriksson Engineering*
Date Performed	*01/31/2017*
Analysis Time Period	*3:00 - 4:00 PM*

Site Information

Intersection	*Miner/Windsor*
Jurisdiction	*Arlington Heights*
Analysis Year	*2016*

Project ID *Proposed Conditions*

East/West Street: *Miner Street* | North/South Street: *Windsor Drive*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*21*	*58*	*34*	*29*	*48*	*3*
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	*20*	*30*	*7*	*9*	*23*	*18*
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	*LTR*		*LTR*		*LTR*		*LTR*	
PHF	*0.82*		*0.82*		*0.82*		*0.82*	
Flow Rate (veh/h)	*136*		*96*		*68*		*59*	
% Heavy Vehicles	*0*		*0*		*0*		*0*	
No. Lanes	*1*		*1*		*1*		*1*	
Geometry Group	*1*		*1*		*1*		*1*	
Duration, T	*0.25*							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	*0.2*		*0.4*		*0.4*		*0.2*	
Prop. Right-Turns	*0.3*		*0.0*		*0.1*		*0.4*	
Prop. Heavy Vehicle	*0.0*		*0.0*		*0.0*		*0.0*	
hLT-adj	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
hRT-adj	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*	*-0.6*
hHV-adj	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*	*1.7*
hadj, computed	*-0.1*		*0.1*		*-0.0*		*-0.2*	

Departure Headway and Service Time

hd, initial value (s)	*3.20*		*3.20*		*3.20*		*3.20*	
x, initial	*0.12*		*0.09*		*0.06*		*0.05*	
hd, final value (s)	*4.16*		*4.39*		*4.49*		*4.32*	
x, final value	*0.157*		*0.117*		*0.085*		*0.071*	
Move-up time, m (s)	*2.0*		*2.0*		*2.0*		*2.0*	
Service Time, t_s (s)	*2.2*		*2.4*		*2.5*		*2.3*	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	*850*		*800*		*850*		*843*	
Delay (s/veh)	*7.9*		*8.0*		*7.9*		*7.6*	
LOS	*A*		*A*		*A*		*A*	
Approach: Delay (s/veh)	*7.9*		*8.0*		*7.9*		*7.6*	
LOS	*A*		*A*		*A*		*A*	
Intersection Delay (s/veh)	*7.9*							
Intersection LOS	*A*							

HCS+™ Version 5.6 Generated: 1/31/2017 2:47 PM

HCS7 Two-Way Stop-Control Report

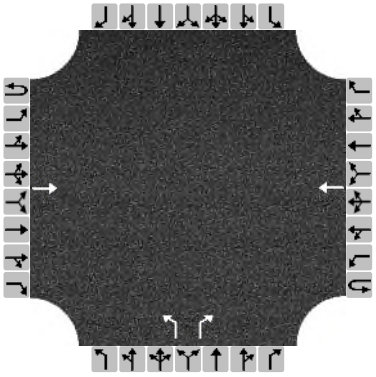
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Outbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Outbound Driveway
Peak Hour Factor	0.75
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume, V (veh/h)			90				76			72		36				
Percent Heavy Vehicles (%)										3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										7.13		6.23				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										96		48				
Capacity, c (veh/h)										695		884				
v/c Ratio										0.14		0.05				
95% Queue Length, Q_{95} (veh)										0.5		0.2				
Control Delay (s/veh)										11.0		9.3				
Level of Service, LOS										B		A				
Approach Delay (s/veh)										10.4						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

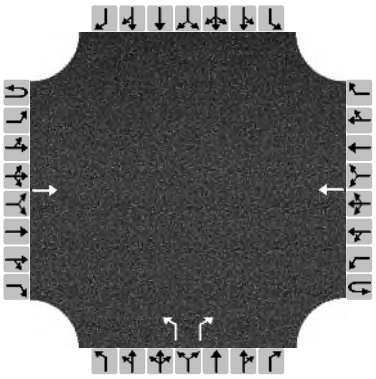
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Outbound Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	School Outbound Driveway
Peak Hour Factor	0.69
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		1	0	1		0	0	0
Configuration			T				T			L		R				
Volume, V (veh/h)			89				66			75		24				
Percent Heavy Vehicles (%)										3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										7.13		6.23				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)										109		35				
Capacity, c (veh/h)										655		835				
v/c Ratio										0.17		0.04				
95% Queue Length, Q_{95} (veh)										0.6		0.1				
Control Delay (s/veh)										11.6		9.5				
Level of Service, LOS										B		A				
Approach Delay (s/veh)										11.1						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

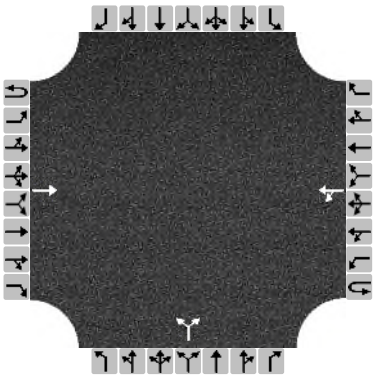
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	8:15 - 9:15 AM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Shared Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	Shared Driveway
Peak Hour Factor	0.79
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration			T			LT					LR					
Volume, V (veh/h)			187			1	105			31		12				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				7.13		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						1					54					
Capacity, c (veh/h)						1270					601					
v/c Ratio						0.00					0.09					
95% Queue Length, Q_{95} (veh)						0.0					0.3					
Control Delay (s/veh)						7.8					11.6					
Level of Service, LOS						A					B					
Approach Delay (s/veh)						0.1					11.6					
Approach LOS											B					

HCS7 Two-Way Stop-Control Report

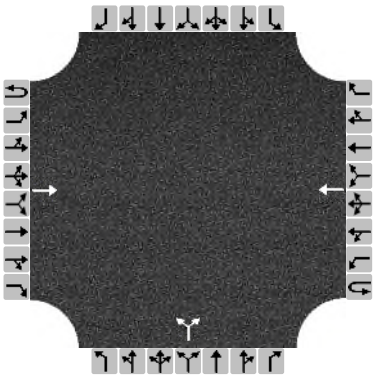
General Information

Analyst	AJB
Agency/Co.	Eriksson Engineering
Date Performed	01/31/2017
Analysis Year	2016
Time Analyzed	3:00 - 4:00 PM
Intersection Orientation	East-West
Project Description	Proposed Conditions

Site Information

Intersection	Miner/Shared Drive
Jurisdiction	Arlington Heights
East/West Street	Miner Road
North/South Street	Shared Driveway
Peak Hour Factor	0.61
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	0	0
Configuration			T				T				LR					
Volume, V (veh/h)			138				111			51		10				
Percent Heavy Vehicles (%)										3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)										7.1		6.2				
Critical Headway (sec)										7.13		6.23				
Base Follow-Up Headway (sec)										3.5		3.3				
Follow-Up Headway (sec)										3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)											100					
Capacity, c (veh/h)											533					
v/c Ratio											0.19					
95% Queue Length, Q_{95} (veh)											0.7					
Control Delay (s/veh)											13.3					
Level of Service, LOS											B					
Approach Delay (s/veh)										13.3						
Approach LOS										B						