

## Boone Clinton Area Elementary School Traffic Study

This report details the results of a traffic study conducted by Parsons Transportation Group for the proposed Boone Clinton Area Elementary School at Whipple Street & North Shore Avenue. This study addresses the traffic conditions in the site area with and without the proposed elementary school. The proposed new school will consist of a 105,536 square-foot, elementary school for 900 students.

### Existing Conditions

Transportation conditions in the site vicinity were inventoried. Three general components of existing conditions were considered: (1) the geographical location of the site, (2) the characteristics of the area streets and traffic control devices; and (3) the characteristics of the traffic on these streets.

### Site Location

The site is located west of the t-intersection of Whipple Street & North Shore. The project site and the surrounding roadway network are shown on Figure 1.



SITE LOCATION

Figure 1

# **PARSONS**

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## **Site Accessibility**

The principal streets in the site vicinity are illustrated in Figure 2, Existing Roadway Configuration, and described in the following paragraphs.

Whipple Street is a north-south local road that begins one block north of North Shore Avenue at Pratt Boulevard. The roadway is one-way in the southbound direction. It has one through lane in the vicinity of the site with parking on both sides of the street. There is no posted speed limit, and therefore the speed limit was assumed to be 30 mph. (See Chicago Police Department website.) The intersection of Whipple Street and North Shore Avenue is stop controlled.

North Shore Avenue is an east-west local road. It is one-way in the westbound direction and terminates at Whipple Street, forming a t-intersection. It has one through lane and there is parking on both sides of the street.

Pratt Boulevard is an east-west collector street. It has one lane in each direction. There is parking on both sides of the street. The t-intersection at Whipple is uncontrolled.

Albion Avenue is an east-west local road. It is one-way in the eastbound direction. It has one through lane and there is parking on both sides of the street. The intersections at Whipple Street and Sacramento Avenue are both stop-controlled.

Sacramento Avenue is a north-south local road. It is one-way in the northbound direction. It has one through lane and there is parking on both sides of the street. The intersection at North Shore Avenue is stop-controlled.

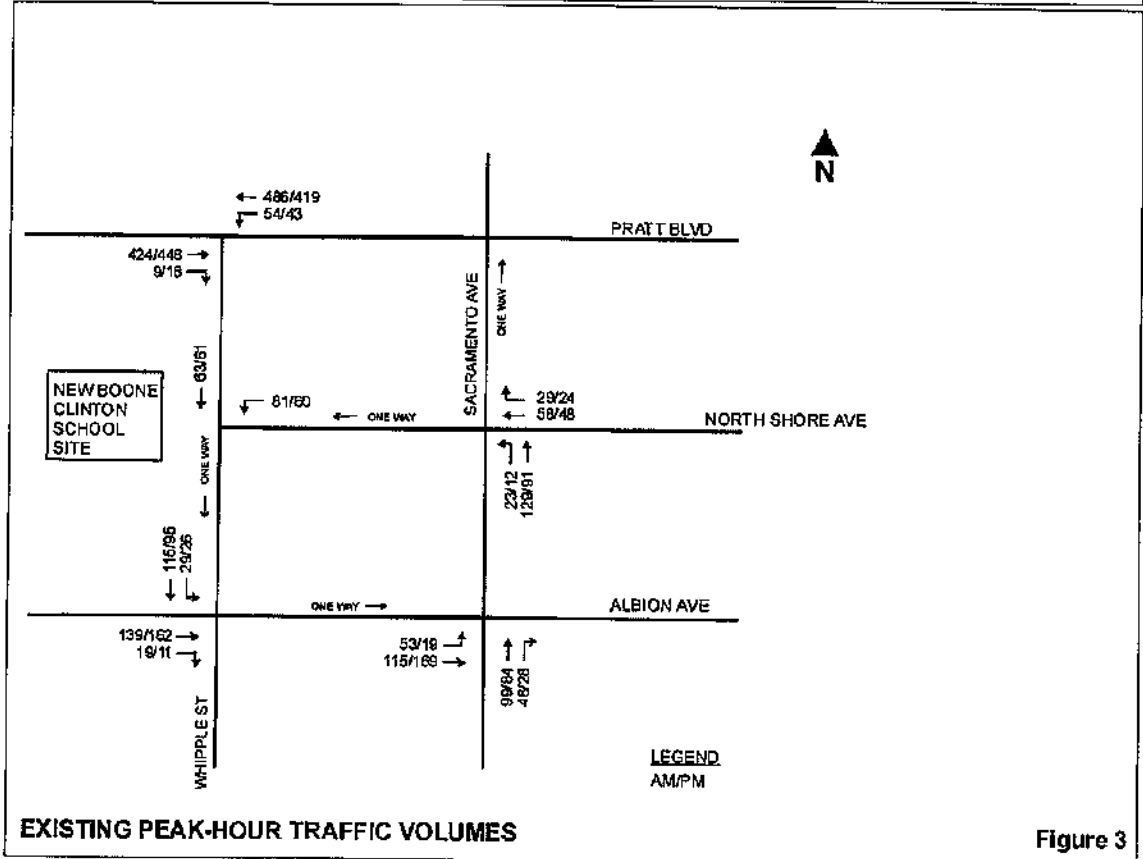
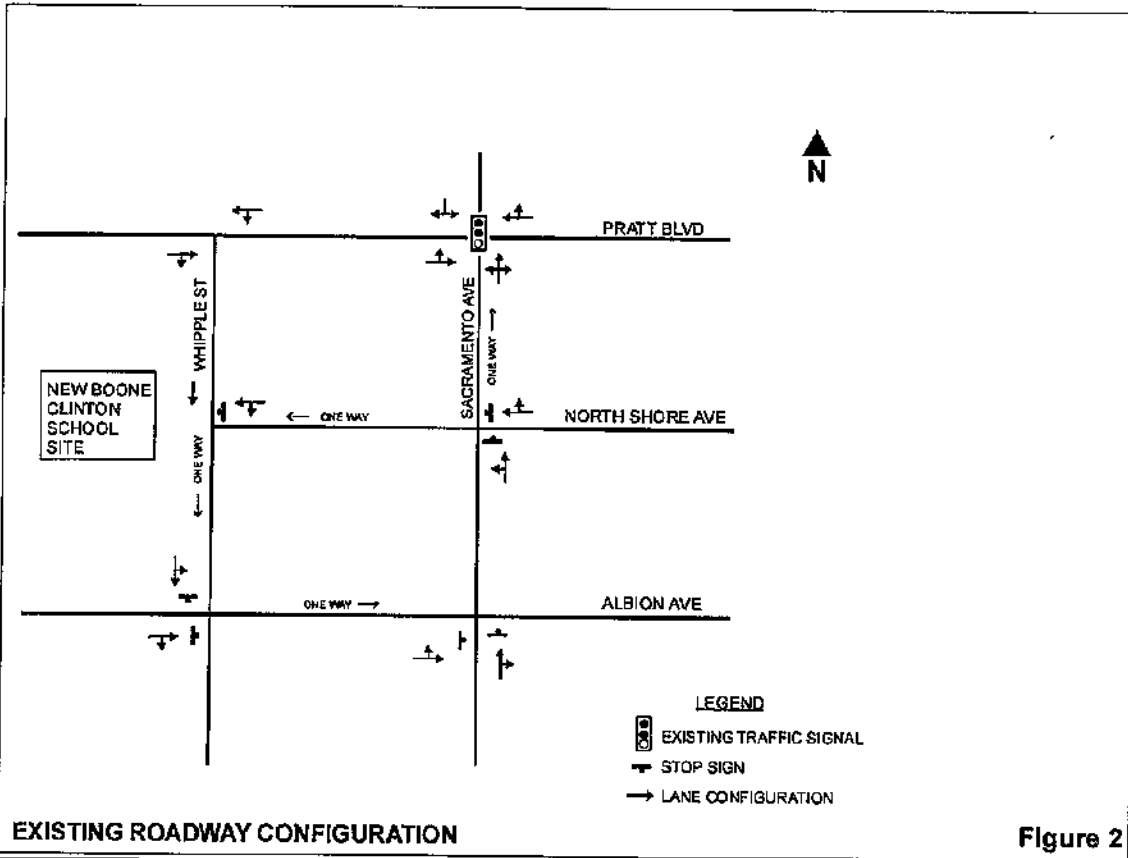
A layout for the proposed Boone Clinton Area Elementary School is shown in Appendix A.

## **Existing Traffic Volumes**

Traffic counts were conducted on May 28<sup>th</sup> and 29<sup>th</sup>, 2008, at 4 intersections in the project area during the weekday morning (7:00 to 9:00 A.M.) and afternoon (2:00 to 4:00 P.M.). These times were chosen to correspond with the times Chicago Public School children are typically dropped-off and picked-up from school (based on phone conversations with administrators at the other elementary schools in the vicinity of the proposed Boone Clinton Area School). Traffic counts were conducted at the following locations:

- Pratt Boulevard and Whipple Street
- Whipple Street and North Shore Avenue
- Whipple Street and Albion Avenue
- Albion Avenue and Sacramento Avenue

The peak hours of traffic were found to be 7:45 – 8:45 A.M. in the morning and 3:00 to 4:00 P.M. in the afternoon. The traffic volumes for these hours are shown in Figure 3.



## Development of Future Traffic Characteristics

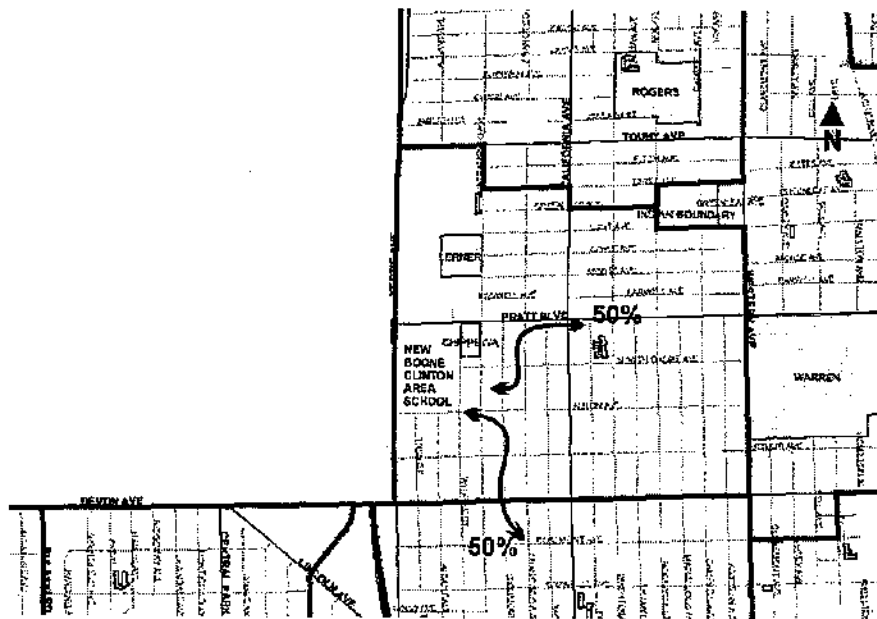
In order to evaluate future traffic conditions with the proposed Boone Clinton Area Elementary School, Parsons determined the directional distribution of the additional traffic generated by the school. Parsons projected the directional distribution of additional traffic by considering the existing schools in the vicinity of the new school likely to receive overcrowding relief. Information regarding existing school boundaries was used by Parsons to determine the potential new boundaries and corresponding student base.

Schools that would likely receive overcrowding relief include:

School Receiving Overcrowding Relief	Percentage of New Boone Clinton Area School Population
Boone	50%
Clinton	50%

## Directional Distribution

The proposed Boone Clinton Area Elementary School drop-off site will be accessed by the stop-controlled intersection at Whipple Street & North Shore Avenue. The directional distribution of traffic generated by the new school was based on the proximity of the new school to each of the existing schools and their respective boundaries. Due to the location of the proposed school in the west portion of the proposed school boundary, a majority of the generated traffic will approach the school from the east. The directional distribution is shown in Figure 4.



Students are estimated to attend the new school from the following school areas in the below noted percentages.

From : Boone - 50%  
Clinton - 50%

Figure 4

## **Trip Generation**

Based on conversations with Chicago Public School administrators, it was determined that approximately 10% of the students are dropped-off and picked-up at school. Approximately 3 buses will drop-off and pick-up special needs students. The majority of students walk to school in the area of the proposed Boone Clinton Area Elementary School.

Trips generated for the proposed site were based on the number of students slated to attend the new school (900 students) and the supposition that approximately 10% of students were dropped-off and picked-up in automobiles. It is assumed that all trips originate at the students home, and then return home. It is likely that many of the parents may proceed to alternate locations after dropping-off, however the post-drop-off destinations are not known. Therefore, it is assumed they return from the spot of origin. Based on these assumptions, we estimate 90 trips entering and exiting the site during both morning and afternoon peaks.

The proposed staff parking lot for the Boone Clinton Area School accommodates 30 vehicles. It was assumed that the lot would be fully utilized with staff arriving during the AM peak-hour and departing during the PM peak-hour.

## **Traffic Assignment**

Traffic was assumed to utilize the path of least resistance to access the drop-off/pick-up on Whipple Street. Vehicles arriving from the south would use Sacramento Avenue and turn left onto North Shore Avenue. Trips originating from the north would use Pratt Boulevard and turn left onto Whipple Street. Vehicles arriving from the east would use North Shore Avenue and vehicles arriving from the west would use either Albion Avenue or Pratt Boulevard.

The estimated weekday peak-hour traffic volumes generated by the proposed Boone Clinton Area Elementary School were assigned to the area street network according to the directional distribution. The proposed drop-off and pick-up location at the school is located on Whipple Street south of the North Shore Avenue intersection in front of the school. All traffic will drop-off and pick-up at this location. The estimated generated site traffic volumes are shown in Figure 5. The total peak-hour volumes, which include the existing traffic and the additional traffic generated by the site expansion, are shown in Figure 6.

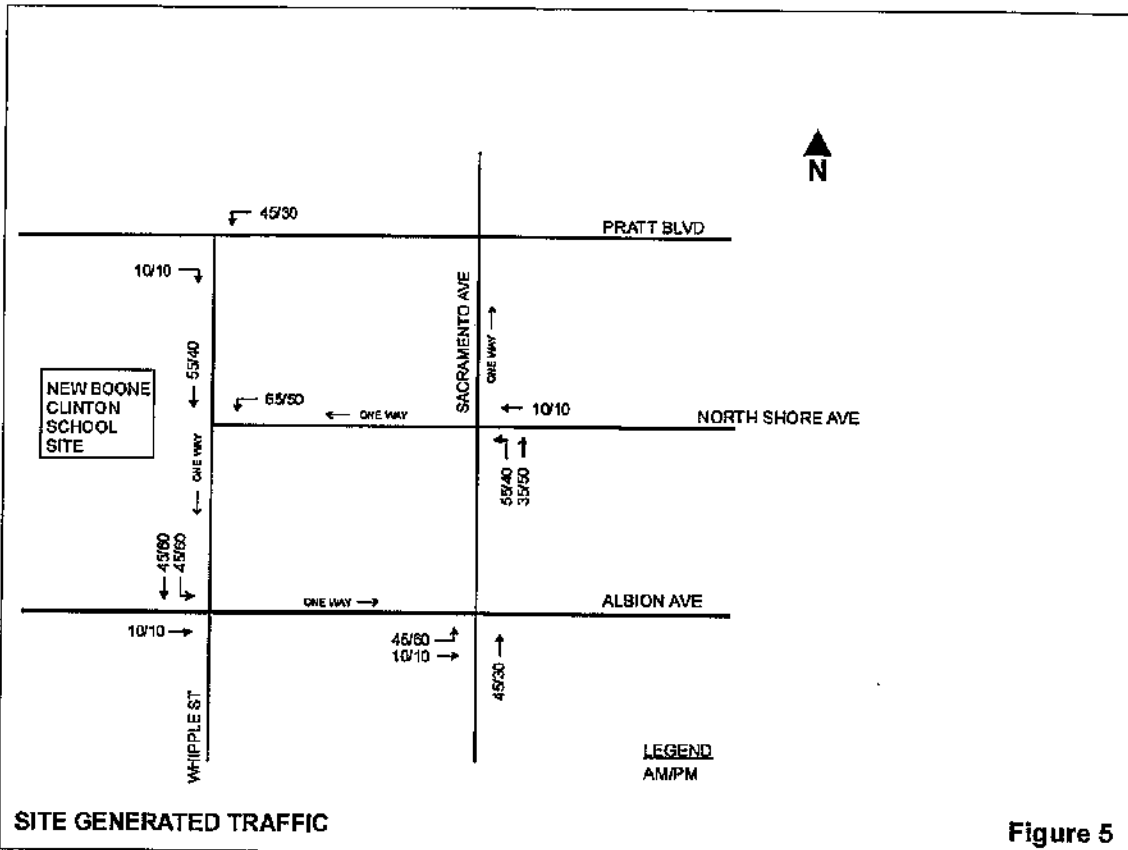


Figure 5

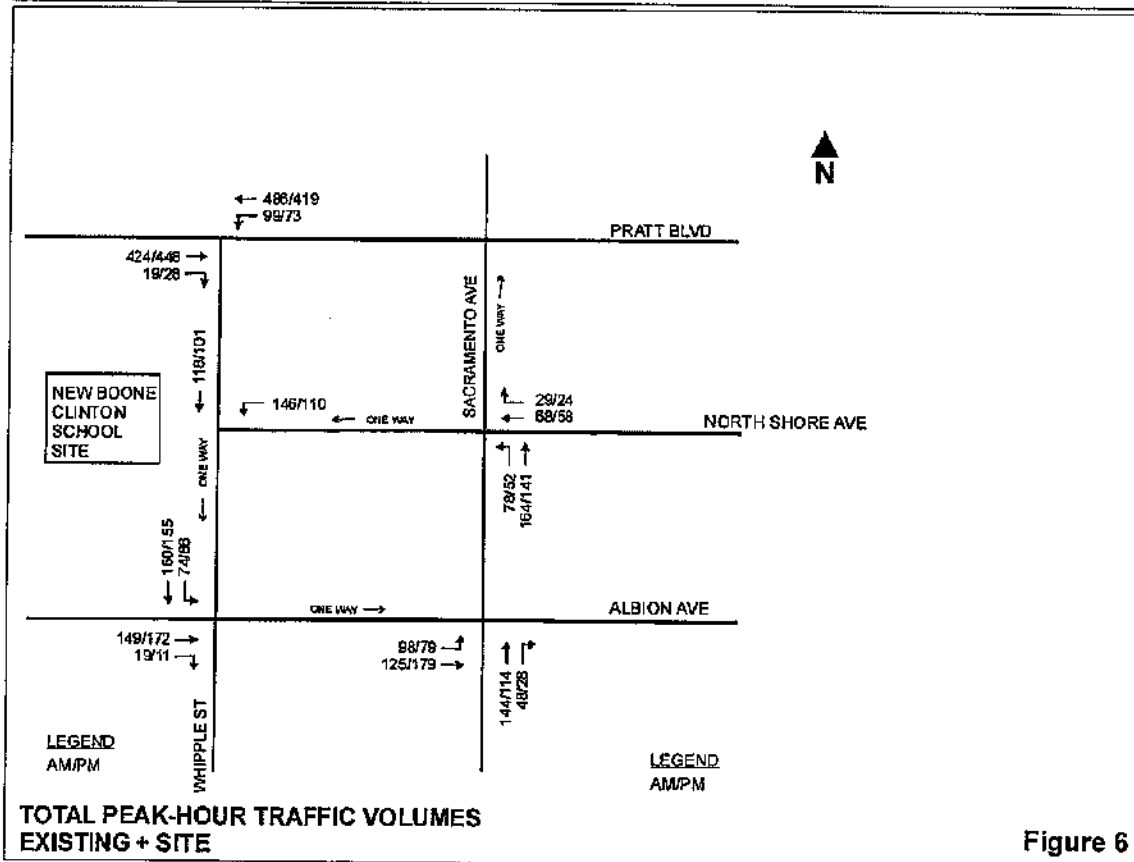


Figure 6

## Analysis and Evaluation

The street network was analyzed to determine impacts of the proposed Boone Clinton Area Elementary School. In particular the signalized and unsignalized intersections along Whipple Street in the vicinity of the proposed school were analyzed using Synchro 6 software. This software analyzes traffic at a given location and provides information regarding average vehicle delay, and queue lengths. These factors are used to assign a letter grade to an intersection and each specific movement, Level of Service (LOS).

The generally accepted minimum LOS at an intersection is D. An LOS of A indicates little if any delay, and an LOS of F indicates an overcapacity situation. Table 1 details the results of the Synchro analysis; the signalized intersection capacity analysis worksheets are included in Appendix B.

The analysis shows that the additional traffic generated by a new school will not significantly impact any of the surrounding intersections. The stop-controlled intersections in the neighborhood along Whipple Street and Sacramento Avenue will function at LOS A. Similarly, the unsignalized intersection at Pratt Boulevard and Whipple Street will continue to function at LOS B during both the AM and PM peak-hours.

**Table 1 - Analysis Results**

Intersection UNSIGNALIZED INTERSECTIONS	EXISTING						EXISTING PLUS SITE					
	AM			PM			AM			PM		
	LOS	Delay (SEC)	Queue Length (FT)	LOS	Delay (SEC)	Queue Length (FT)	LOS	Delay (SEC)	Queue Length (FT)	LOS	Delay (SEC)	Queue Length (FT)
Pratt @ Whipple	B	0.8		B	0.6		B	1.4		B	1.0	
EB	A	0.0		A	0.0		A	0.0		A	0.0	
WB	A	1.4	4	A	1.3	3	A	2.5	8	A	2.1	6
North Shore @ Whipple	A	5.2		A	4.5		A	5.6		A	5.1	
WB	A	9.2	8	A	9.1	6	B	10.1	17	A	9.7	12
SB	A	.0		A	0.0		A	0.0		A	0.0	
North Shore @ Sacramento	A	8.0		A	7.6		A	8.8		A	8.3	
WB	A	7.6		A	7.4		A	8.0		A	7.7	
NB	A	8.2		A	7.7		A	9.1		A	8.5	
Albion @ Whipple	A	8.3		A	8.3		A	9.2		A	9.4	
EB	A	8.3		A	8.4		A	8.8		A	9.0	
SB	A	8.4		A	8.2		A	9.5		A	9.7	
Albion @ Sacramento	A	8.4		A	8.3		A	9.2		A	9.2	
EB	A	8.6		A	8.6		A	9.5		A	9.6	
NB	A	8.1		A	8.0		A	8.9		A	8.5	

## Conclusion

The traffic generated by the new Boone Clinton Area School will have little impact on the LOS along the neighborhood intersections and along Pratt Boulevard. There is a drop-off/pick-up location designated along Whipple Street just south of North Shore Avenue for parents and just north of North Shore Avenue for buses. These locations along with ample on-street parking will provide adequate space to facilitate drop-off and pick-up operations for the proposed school.

It is recommended that a crossing guard be provided to assist children when crossing Whipple Street at North Shore Avenue. There is not a stop sign on Whipple southbound at North Shore Avenue, and we are not recommending one at this time. A stop sign is not recommended crossing a two lane road with average daily traffic less than 10,000 motor vehicles per day and where the speed limit is 40 mph or less.

## APPENDIX A



## APPENDIX B



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔			
Sign Control	Free		Free		Stop	
Grade	0%		0%			
Volume (veh/h)	424	9	54	486	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	461	10	59	528	0	0
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			471		1111	466
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			471		1111	466
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			1091		219	597

Direction	Lane #	EB 1	WB 1
Volume Total		471	587
Volume Left		0	59
Volume Right		10	0
cSH		1700	1091
Volume to Capacity		0.28	0.05
Queue Length 95th (ft)		0	4
Control Delay (s)		0.0	1.4
Lane LOS			A
Approach Delay (s)		0.0	1.4
Approach LOS			

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		58.1%	ICU Level of Service
Analysis Period (min)		15	B



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↖				↗	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	81	0	0	0	0	63
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	0	0	0	0	68
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	68	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	68	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	100			100	
cM capacity (veh/h)	936	1085			1623	

Direction	Lane #	WB I	SB I
Volume Total		88	68
Volume Left		88	0
Volume Right		0	0
cSH		936	1700
Volume to Capacity		0.09	0.04
Queue Length 95th (ft)		8	0
Control Delay (s)		9.2	0.0
Lane LOS		A	
Approach Delay (s)		9.2	0.0
Approach LOS		A	

Intersection Summary:			
Average Delay		5.2	
Intersection Capacity Utilization		33.2%	ICU Level of Service
Analysis Period (min)		15	A

AM Existing  
4: North Shore & Sacramento

Timing Plan: AM EX  
AM Existing



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↑			↑				
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	58	29	23	129	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	63	32	25	140	0	0	0	0

Direction Lane #	WB	NB
Volume Total (vph)	95	165
Volume Left (vph)	0	25
Volume Right (vph)	32	0
Hadj (s)	-0.17	0.06
Departure Headway (s)	4.1	4.2
Degree Utilization, x	0.11	0.19
Capacity (veh/h)	843	838
Control Delay (s)	7.6	8.2
Approach Delay (s)	7.6	8.2
Approach LOS	A	A

**Intersection Summary**

Delay	8.0
HCM Level of Service	A
Intersection Capacity Utilization	20.7%
Analysis Period (min)	15
ICU Level of Service	A

AM Existing  
3: Albion & Whipple

Timing Plan: AM EX  
AM Existing

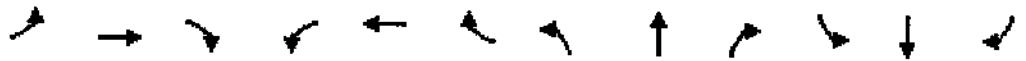


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑									↑	
Sign Control		Stop			Yield			Yield			Stop	
Volume (vph)	0	139	19	0	0	0	0	0	0	29	115	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	151	21	0	0	0	0	0	0	32	125	0

Direction Lane #	EB 1	SB 1
Volume Total (vph)	172	157
Volume Left (vph)	0	32
Volume Right (vph)	21	0
Hadj (s)	-0.04	0.07
Departure Headway (s)	4.2	4.4
Degree Utilization, x	0.20	0.19
Capacity (veh/h)	823	792
Control Delay (s)	8.3	8.4
Approach Delay (s)	8.3	8.4
Approach LOS	A	A

**Intersection Summary**

Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4						4				
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	53	115	0	0	0	0	0	99	48	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	58	125	0	0	0	0	0	108	52	0	0	0

Direction Lane #	EB 1	NB 1
Volume Total (vph)	183	160
Volume Left (vph)	58	0
Volume Right (vph)	0	52
Hadj (s)	0.10	-0.16
Departure Headway (s)	4.4	4.2
Degree Utilization, x	0.22	0.18
Capacity (veh/h)	800	828
Control Delay (s)	8.6	8.1
Approach Delay (s)	8.6	8.1
Approach LOS	A	A

**Intersection Summary**

Delay	8.4		
HCM Level of Service	A		
Intersection Capacity Utilization	38.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↕			
Sign Control	Free		Free		Stop	
Grade	0%		0%			
Volume (veh/h)	448	18	43	419	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	487	20	47	455	0	0
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			507		1046	497
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			507		1046	497
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1058		242	573

Direction	Lane #	EBT	WBL
Volume Total		507	502
Volume Left		0	47
Volume Right		20	0
cSH		1700	1058
Volume to Capacity		0.30	0.04
Queue Length 95th (ft)		0	3
Control Delay (s)		0.0	1.3
Lane LOS			A
Approach Delay (s)		0.0	1.3
Approach LOS			

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		55.8%	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)	60	0	0	0	0	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	65	0	0	0	0	66
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	66	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	66	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	939	1085			1623	

Direction \ Lane #	WB	SB
Volume Total	65	66
Volume Left	65	0
Volume Right	0	0
cSH	939	1700
Volume to Capacity	0.07	0.04
Queue Length 95th (ft)	6	0
Control Delay (s)	9.1	0.0
Lane LOS	A	
Approach Delay (s)	9.1	0.0
Approach LOS	A	

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	32.3%	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			Stop			Stop	
Volume (vph)	0	0	0	0	48	24	12	91	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	52	26	13	99	0	0	0	0

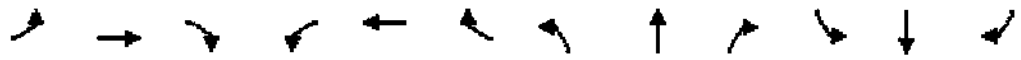
Direction Lane #	WB1	NB1
Volume Total (vph)	78	112
Volume Left (vph)	0	13
Volume Right (vph)	26	0
Hadj (s)	-0.17	0.06
Departure Headway (s)	4.0	4.1
Degree Utilization, x	0.09	0.13
Capacity (veh/h)	876	848
Control Delay (s)	7.4	7.7
Approach Delay (s)	7.4	7.7
Approach LOS	A	A

**Intersection Summary**

Delay	7.6	
HCM Level of Service	A	
Intersection Capacity Utilization	19.8%	ICU Level of Service
Analysis Period (min)	15	A

PM Existing  
3: Albion & Whipple

Timing Plan: PM EX  
PM Existing

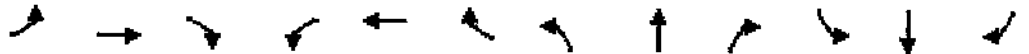


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑									↑	
Sign Control		Stop			Yield			Yield			Stop	
Volume (vph)	0	162	11	0	0	0	0	0	0	26	95	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	176	12	0	0	0	0	0	0	28	103	0

Direction	Lane #	EB 1	SB 1
Volume Total (vph)		188	132
Volume Left (vph)		0	28
Volume Right (vph)		12	0
Hadj (s)		0.00	0.08
Departure Headway (s)		4.2	4.4
Degree Utilization, x		0.22	0.16
Capacity (veh/h)		831	782
Control Delay (s)		8.4	8.2
Approach Delay (s)		8.4	8.2
Approach LOS		A	A

**Intersection Summary**

Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	22.3%	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			Stop			Stop	
Volume (vph)	19	169	0	0	0	0	0	84	28	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	184	0	0	0	0	0	91	30	0	0	0

Direction Lane #	EB	NB
Volume Total (vph)	204	122
Volume Left (vph)	21	0
Volume Right (vph)	0	30
Hadj (s)	0.05	-0.12
Departure Headway (s)	4.2	4.3
Degree Utilization, x	0.24	0.14
Capacity (veh/h)	828	807
Control Delay (s)	8.6	8.0
Approach Delay (s)	8.6	8.0
Approach LOS	A	A

**Intersection Summary**

Delay	8.3	
HCM Level of Service	A	
Intersection Capacity Utilization	40.5%	ICU Level of Service A
Analysis Period (min)	15	



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔		↔			
Sign Control	Free		Free		Stop	
Grade	0%		0%			
Volume (veh/h)	424	19	99	486	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	461	21	108	528	0	0
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			482		1215	471
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			482		1215	471
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			90		100	100
cM capacity (veh/h)			1081		180	593

Direction/Lane #	EB 1	WB 1
Volume Total	482	636
Volume Left	0	108
Volume Right	21	0
cSH	1700	1081
Volume to Capacity	0.28	0.10
Queue Length 95th (ft)	0	8
Control Delay (s)	0.0	2.5
Lane LOS		A
Approach Delay (s)	0.0	2.5
Approach LOS		

Intersection Summary			
Average Delay		1.4	
Intersection Capacity Utilization	61.2%	ICU Level of Service	B
Analysis Period (min)		15	



Movement	WBL	WBR	NBT	NBR	SB	SBT
Lane Configurations	↖				↗	
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Volume (veh/h)	146	0	0	0	0	118
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	159	0	0	0	0	128
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	128	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	128	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	100			100	
cM capacity (veh/h)	866	1085			1623	

Direction	Lane #	WB 1	SB 1
Volume Total		159	128
Volume Left		159	0
Volume Right		0	0
cSH		866	1700
Volume to Capacity		0.18	0.08
Queue Length 95th (ft)		17	0
Control Delay (s)		10.1	0.0
Lane LOS		B	
Approach Delay (s)		10.1	0.0
Approach LOS		B	

Intersection Summary			
Average Delay		5.6	
Intersection Capacity Utilization		37.5%	ICU Level of Service A
Analysis Period (min)		15	

AM Existing + Site  
4: North Shore & Sacramento

Timing Plan: AM EX + Site  
AM Existing + Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔				
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	0	0	0	68	29	78	164	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	74	32	85	178	0	0	0	0

Direction	Lane #	WB	NB
Volume Total (vph)		105	263
Volume Left (vph)		0	85
Volume Right (vph)		32	0
Hadj (s)		-0.15	0.10
Departure Headway (s)		4.4	4.2
Degree Utilization, x		0.13	0.31
Capacity (veh/h)		772	826
Control Delay (s)		8.0	9.1
Approach Delay (s)		8.0	9.1
Approach LOS		A	A

**Intersection Summary**

Delay		8.8	
HCM Level of Service		A	
Intersection Capacity Utilization	25.0%		ICU Level of Service
Analysis Period (min)		15	A

AM Existing + Site  
3: Albion & Whipple

Timing Plan: AM EX + Site  
AM Existing + Site



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖									↗	
Sign Control		Stop			Yield			Yield			Stop	
Volume (vph)	0	149	19	0	0	0	0	0	0	74	160	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	162	21	0	0	0	0	0	0	80	174	0

Direction/Lane #	EB 1	SB 1
Volume Total (vph)	183	254
Volume Left (vph)	0	80
Volume Right (vph)	21	0
Hadj (s)	-0.03	0.10
Departure Headway (s)	4.5	4.4
Degree Utilization, x	0.23	0.31
Capacity (veh/h)	759	783
Control Delay (s)	8.8	9.5
Approach Delay (s)	8.8	9.5
Approach LOS	A	A

**Intersection Summary**

Delay	9.2
HCM Level of Service	A
Intersection Capacity Utilization	28.2%
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			Stop			Stop	
Volume (vph)	98	125	0	0	0	0	0	144	48	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	107	136	0	0	0	0	0	157	52	0	0	0

Direction Lane #	EBL	NB1
Volume Total (vph)	242	209
Volume Left (vph)	107	0
Volume Right (vph)	0	52
Hadj (s)	0.12	-0.12
Departure Headway (s)	4.5	4.4
Degree Utilization, x	0.30	0.25
Capacity (veh/h)	761	784
Control Delay (s)	9.5	8.9
Approach Delay (s)	9.5	8.9
Approach LOS	A	A

Intersection Summary	
Delay	9.2
HCM Level of Service	A
Intersection Capacity Utilization	29.2%
ICU Level of Service	A
Analysis Period (min)	15



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕		↕			
Sign Control	Free		Free		Stop	
Grade	0%		0%			
Volume (veh/h)	448	28	73	419	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	487	30	79	455	0	0
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			517		1116	502
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			517		1116	502
IC, single (s)			4.1		6.4	6.2
IC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
pD queue free %			92		100	100
cM capacity (veh/h)			1048		212	569

Direction/Lane #	EB 1	WB 1
Volume Total	517	535
Volume Left	0	79
Volume Right	30	0
cSH	1700	1048
Volume to Capacity	0.30	0.08
Queue Length 95th (ft)	0	6
Control Delay (s)	0.0	2.1
Lane LOS		A
Approach Delay (s)	0.0	2.1
Approach LOS		

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization	58.0%	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)	110	0	0	0	0	101
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	120	0	0	0	0	110
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	110	0			0	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	110	0			0	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	100			100	
cM capacity (veh/h)	887	1085			1623	

Direction Lane	WB 1	SB 1
Volume Total	120	110
Volume Left	120	0
Volume Right	0	0
cSH	887	1700
Volume to Capacity	0.13	0.06
Queue Length 95th (ft)	12	0
Control Delay (s)	9.7	0.0
Lane LOS	A	
Approach Delay (s)	9.7	0.0
Approach LOS	A	

Intersection Summary			
Average Delay	5.1		
Intersection Capacity Utilization	34.0%	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			Stop			Stop	
Volume (vph)	0	0	0	0	58	24	52	141	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	0	0	63	26	57	153	0	0	0	0

Direction/Lane #	WB1	NB1
Volume Total (vph)	89	210
Volume Left (vph)	0	57
Volume Right (vph)	26	0
Hadj (s)	-0.14	0.09
Departure Headway (s)	4.2	4.2
Degree Utilization, x	0.10	0.24
Capacity (veh/h)	800	837
Control Delay (s)	7.7	8.5
Approach Delay (s)	7.7	8.5
Approach LOS	A	A

**Intersection Summary**

Delay	8.3
HCM Level of Service	A
Intersection Capacity Utilization	21.5%
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			Yield			Yield			Stop	
Volume (vph)	0	172	11	0	0	0	0	0	0	86	155	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	187	12	0	0	0	0	0	0	93	168	0

Direction	Lane #	EB	SB
Volume Total (vph)		199	262
Volume Left (vph)		0	93
Volume Right (vph)		12	0
Hadj (s)		0.00	0.11
Departure Headway (s)		4.5	4.5
Degree Utilization, x		0.25	0.33
Capacity (veh/h)		750	773
Control Delay (s)		9.0	9.7
Approach Delay (s)		9.0	9.7
Approach LOS		A	A

**Intersection Summary**

Delay		9.4	
HCM Level of Service		A	
Intersection Capacity Utilization	29.3%		ICU Level of Service
Analysis Period (min)		15	A



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↕						↕					
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	79	179	0	0	0	0	0	114	28	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	195	0	0	0	0	0	124	30	0	0	0

Direction Lane #	EB 1	NB 1
Volume Total (vph)	280	154
Volume Left (vph)	86	0
Volume Right (vph)	0	30
Hadj (s)	0.10	-0.08
Departure Headway (s)	4.4	4.5
Degree Utilization, x	0.34	0.19
Capacity (veh/h)	802	759
Control Delay (s)	9.6	8.5
Approach Delay (s)	9.6	8.5
Approach LOS	A	A

Intersection Summary	
Delay	9.2
HCM Level of Service	A
Intersection Capacity Utilization	28.2%
ICU Level of Service	A
Analysis Period (min)	15