Traffic Impact Study

Affinity Elmwood Gateway Properties LLC

City of Buffalo
Erie County, New York

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June 2016

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EXECUTIVE SUMMARY

This traffic impact study evaluates the potential transportation impacts from a proposed mixed-use facility on the southeast corner of Elmwood Avenue and Forest Avenue in the City of Buffalo, New York. This project is proposed to be a five-story structure with the upper two floors stepped back. It contains 57 condominium apartments with three separate 2,500 square foot commercial spaces on the first floor ("Project"). The Project includes on-site parking spaces to accommodate residents and the commercial space and will have two ingress and egress points; one located on Forest Avenue and one on Elmwood Avenue.

The Project will be located on 1091-1121 Elmwood Avenue and 605-607 Forest Avenue, Buffalo, Erie County, New York. The Project will include the demolition of 14 existing structures on the site. This site is within the delineations of the Elmwood Village, and is situated southeast to the State University College of New York at Buffalo and the H.H. Richardson Complex.

The study area is defined by all roads that provide access to the project site. The study area incorporates all intersections to be modeled for existing and future no-build and build scenarios. In conjunction with discussions with the City of Buffalo Department of Public Works, Parks, and Streets, the study area is defined as the following intersections:

- Elmwood Avenue & Rockwell Road/Albright Knox Art Gallery - signalized
- Elmwood Avenue & Forest Avenue - signalized
- Elmwood Avenue & Panos Restaurant Access
- Elmwood Avenue & Bird Avenue - signalized
- Forest Avenue & Richmond Avenue - signalized
- Forest Avenue & Granger Place/Penhurst Park
- Forest Avenue & Lincoln Parkway

Turning movement counts were collected at the study area intersections on Tuesday, May 3rd from 7:00 to 9:00 AM and 4:00 to 6:00 PM, except for the intersections of Elmwood Avenue with Forest Avenue and Bird Avenue. Turning movement counts for those intersections were available from the GBNRTC's online Transportation Data Management System from 2015. The volumes at these two locations were balanced with the more recent counts at the other study area intersections. The peak hours for the study area was determined to be from 7:30 to 8:30 AM and 5:00 to 6:00 PM.

A capacity analysis was performed for the study area using the existing condition traffic volumes with existing roadway and intersection geometry information. All of the analyzed intersection approaches operate at a LOS C or better during both peak periods except for the eastbound approach of Forest Avenue at Elmwood Avenue which is a LOS E during the AM peak hour and a LOS D during the PM peak hour.

The Project is expected to be completely operational in late 2017. There is a hotel expected to be operational at approximately the same time as the Project within the H.H. Richardson Complex. The Hotel Henry is expected to have 88 guest rooms with dining and meeting space. Based on

information provided by the GBNRTC, a compounded growth rate of 1.25% was applied to the existing traffic volumes to derive 2017 background volumes that account for any unknown development that may occur in the area in addition to the Hotel Henry. The background traffic was added to the estimated trips generated by the Hotel Henry to develop the future no-build condition volumes. The only anticipated increase in delay that results in a change in LOS due to the future no-build condition volumes is expected to occur during the PM peak hour eastbound on Rockwell Avenue at Elmwood Avenue from a LOS A to a LOS B (0.4 seconds of delay increase) and eastbound on Forest Avenue at Elmwood Avenue from a LOS D to a LOS E (12.6 seconds of delay increase).

Using the latest ITE Trip Generation Manual, the traffic associated with the Project were estimated. Land use code 230 – Townhomes/Condominiums was used to estimate the traffic associated with the 57 residential units. At the time of this analysis, the exact use of the three separate 2,500 square commercial spaces has not been finalized. For purposes of developing a conservatively high trip generation estimate for the Project, the trip generation for both land use code 931 – Quality Restaurant and code 826 – Specialty Retail Center as defined in the ITE Trip Generation Manual was considered. The AM and PM peak hour trip generation is estimated as follows:

AM Peak Hour		**PM Peak Hour**	
Entering	**Exiting**	**Entering**	**Exiting**
6	27	61	58

The proposed trips were distributed throughout the study intersections based on the access points to the site and existing traffic patterns. The Project will include no fewer than a total of 140 off-street parking spaces, to be contained within two levels beneath the proposed building. The lower level (accessible from Forest Avenue) will contain approximately 90 spaces. The second level (accessible from Elmwood Avenue) will contain approximately 50 parking spaces. The lower parking area accessible from Forest Avenue will contain approximately 50 spaces available for condominium owners and approximately 40 parking spaces available for retail customers. All commercial trips will use Forest Avenue and since the residential parking spaces are close to being equally split between the access points, the trips were split equally between them.

From existing through the future build scenario, there are no changes in LOS for any approaches to any study intersections during the AM peak hour. The vehicles exiting the proposed access points on Elmwood Avenue and Forest Avenue are expected to have a LOS B with minimal delays on Elmwood and Forest Avenues. During the PM peak hour, the delays on the eastbound approach of Forest Avenue at Elmwood Avenue continue to increase resulting in a LOS F (15.8 second increase). There is also a 0.8 second increase in delay on the northbound approach of the center Lincoln Parkway at Forest Avenue. This increase is minimal but occurs right at the threshold from a LOS B to LOS C, which is still considered acceptable. Similar to the AM peak hour, the proposed access points will experience LOS B.

In order to mitigate the increase in delay at the intersection of Elmwood Avenue and Forest Avenue, the signal operations along Elmwood Avenue should be optimized with 100 second

cycle lengths versus the current 80 second cycle lengths. This change reduces delays on Forest Avenue at Elmwood Avenue to acceptable levels, while not significantly impacting the operations of the other signals along Elmwood Avenue.

1. Introduction

a. Project Description

This traffic impact study (TIS) evaluates the potential transportation impacts to the highway system from the proposed mixed-use facility on the southeast corner of Elmwood Avenue and Forest Avenue in the City of Buffalo, New York. This project is proposed to be a five-story structure with the upper two floors stepped back. This project contains 57 condominium apartments with 7,500 square feet of commercial space on the first floor ("Project"). The Project includes on-site parking spaces to accommodate residents and the commercial space and will have two ingress and egress points; one located on Forest Avenue and one on Elmwood Avenue.

The Project will be located on 1091-1121 Elmwood Avenue and 605-607 Forest Avenue, Buffalo, Erie County, New York ("Project Site"). The Project will include the demolition of 14 existing structures on the Project Site. This site is within the delineations of the Elmwood Village Design Standards District, and is situated southeast to the State University College of New York at Buffalo and the H.H. Richardson Complex. A location map of the site is included as **Figure 1-1**.

b. Study Area

The study area is defined by all roads that provide access to the Project Site. The study area incorporates all intersections to be modeled for existing and future no-build and build scenarios. In conjunction with discussions with the City of Buffalo Department of Public Works, Parks, and Streets, the study area is defined as the following intersections (see **Figure 1-2**):

- Elmwood Avenue & Rockwell Road/Albright Knox Art Gallery - signalized
- Elmwood Avenue & Forest Avenue - signalized
- Elmwood Avenue & Panos Restaurant Access
- Elmwood Avenue & Bird Avenue - signalized
- Forest Avenue & Richmond Avenue - signalized
- Forest Avenue & Granger Place/Penhurst Park
- Forest Avenue & Lincoln Parkway

See **Section 2.a** for more detailed roadway network information.

c. Methodology

Several traffic conditions and scenarios were considered and established for the study intersections. These traffic conditions are contained in this report as follows:

- Existing (2016) traffic conditions during the typical AM & PM peak commuter periods
- Design year (2017) no-build traffic conditions during the typical AM & PM peak commuter periods
- Design year (2017) build traffic conditions during typical AM & PM peak commuter periods

The design year traffic condition scenarios include a hotel currently under construction within the H.H. Richardson Complex and a growth of background traffic to account for other unknown development in the area through 2017. The Greater Buffalo Niagara Regional Transportation Council (GBNRTC), the region's metropolitan planning organization, provided a 1.25% growth rate to be used, based on the most recent regional travel demand model.

The effect of the Project on the adjacent roadway network was measured by comparing the operations of the study intersections to operations that are typically considered acceptable. The study intersections were analyzed using SYNCHRO 9[1] which is a computer program that implements the methods presented in the Highway Capacity Manual**.** SYNCHRO determines the level of service (LOS), which is defined in terms of delay, as well as anticipated queue lengths.

The LOS for both signalized and unsignalized intersections are defined in terms of control delay. Control delay is a measure of the total travel time lost and includes slowing delay, stopped delay, queue move-up time, and start-up lost time. LOS thresholds are defined as average delay in seconds per vehicles over a

[1] SYNCHRO 9, Traffic Signal Coordination Software, Version 9.1, Trafficware LLC, Albany, California, 1993-2016.

fifteen-minute analysis period and range from LOS A to F for both signalized and unsignalized intersections. An overall intersection LOS D or better is generally considered acceptable at a signalized intersection. An overall intersection LOS E or better is generally considered acceptable at an unsignalized intersection. The following table provides a summary of the LOS thresholds as defined in the Highway Capacity Manual.

Table 1-1: Intersection Level of Service Criteria

Level of Service (LOS)	Signalized Intersections	Unsignalized Intersections
	Delay (sec)	Delay (sec)
A	0-10	0-10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	over 80	over 50

This TIS also includes a parking supply and demand evaluation for the Project comparing anticipated demand to proposed parking available on-site.

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2. Existing Conditions

a. Roadway Network

The following roadways and intersections make up the study area:

Elmwood Avenue is a north/south, locally-owned roadway with a 30 MPH speed limit within the study area. It is considered an urban minor arterial with 4 lanes north of Forest Avenue and 2 lanes with marked parking lanes south. Elmwood Avenue does provide access to New York State 198 (Scajaquada Expressway) just north of the study area.

Forest Avenue is an east/west, locally-owned roadway with a 30 MPH speed limit within the study area and is also classified as an urban minor arterial. There are 2 travel lanes with parking.

Intersection of Elmwood Avenue & Rockwell Road is a signalized intersection opposite the access to the Albright Knox Art Gallery. There are no dedicated turn lanes on Elmwood Avenue but a dedicated left turn lane on Rockwell Road for those taking a left onto Elmwood Avenue northbound. There are marked crosswalks and pedestrian indications on all approaches.

Google Earth 2016

Intersection of Elmwood Avenue & Forest Avenue is a signalized intersection with a dedicated right turn lane on the southbound approach of Elmwood Avenue. All other approaches consist of one lane. There are marked crosswalks and pedestrian indications on all approaches.

Google Earth 2016

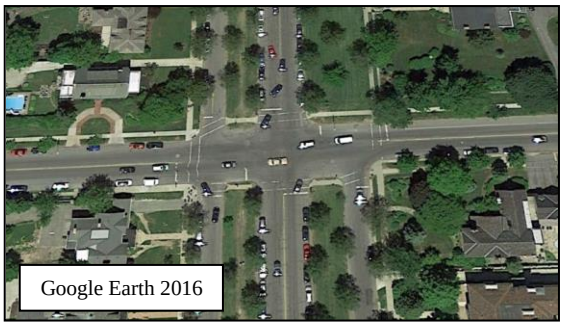
Intersection of Elmwood Avenue & Panos Restaurant consists of two access points for the restaurant formed by a one way driveway around the building. The ingress is south of the restaurant and the egress is just north. The egress from the restauarant is stop-controlled at Elmwood Avenue.

Intersection of Elmwood Avenue & Bird Avenue is a signalized intersection with no dedicated turn lanes. Each approach of Bird Avenue is one way towards Elmwood Avenue – the east approach is one way westbound and the west approach is one way eastbound. There are marked crosswalks on all approaches.

Intersection of Forest Avenue & Richmond Avenue is a signalized intersection with dedicated left turn lanes on Forest Avenue. The north approach is the main access to the H.H. Richardson Complex. There are marked crosswalks and pedestrian indications on all approaches.

Intersection of Forest Avenue & Granger Place/Penhurst Park is stop-controlled on Granger Place and Penhurst Park. Granger Place is one way northbound. There are no dedicated turn lanes, crosswalks, or pedestrian indications at this intersection.

Intersection of Forest Avenue & Lincoln Parkway is actually three, stop-controlled intersections within a couple of hundred feet from each other. Each approach has one lane in each direction and there are crosswalks marked throughout the intersections.



b. Traffic Volumes

Turning movement counts were collected at the study area intersections on Tuesday, May 3rd from 7:00 to 9:00 AM and 4:00 to 6:00 PM, except for the intersections of Elmwood Avenue with Forest Avenue and Bird Avenue. Turning movement counts for those intersections were available from the GBNRTC's online Transportation Data Management System from 2015. The volumes at these two locations were balanced with the more recent counts at the other study area intersections. The peak hours for the study area were determined to be from 7:30 to 8:30 AM and 5:00 to 6:00 PM.

The existing condition AM and PM peak hour volumes are shown in **Figure 2-1** and **Figure 2-2**, respectively, for the study area intersections and interstate highway segments and ramps. The complete turning movement count data is provided in **Appendix A**.

c. Level of Service Analysis

A capacity analysis was performed for the study area using the existing condition traffic volumes with existing roadway and intersection geometry information. **Table 2-1** on page 2-4 shows the LOS, delay in seconds, volume to capacity ratio, and maximum queues for each lane group of each local roadway study intersection.

All of the analyzed intersection approaches operate at a LOS C or better during both peak periods except for the eastbound approach of Forest Avenue at Elmwood Avenue which is a LOS E during the AM peak hour and a LOS D during the PM peak hour.

The existing condition output files from the existing condition Synchro models are included in **Appendix B**.

Table 2-1: Existing Level of Service Summary

Existing Level of Service Summary		AM Peak Hour			PM Peak Hour		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Elmwood Ave & Bird Ave							
Eastbound	LT/RT	B (16.1)	0.13	13	B (18.0)	0.1	24
Westbound	LT/RT	A (9.8)	0.06	3	B (16.0)	0.09	15
Northbound	THRU	A (7.9)	0.35	133	A (7.6)	0.42	184
Southbound	THRU	A (4.7)	0.25	m57	A (3.3)	0.3	m51
Average Intersection LOS (delay in sec)		*A (7.3)*			*A (6.4)*		
Elmwood Ave & Pano's Restaurant							
Westbound	LT/RT	b (13.4)	0.03	3	c (15.3)	0.05	5
Northbound	THRU/RT	n/a			n/a		
Southbound	LT/THRU	a (8.3)	0.01	0	a (8.9)	0.02	3
Elmwood Ave & Rockwell Rd							
Eastbound	LT	C (28.0)	0.18	38	C (34.2)	0.33	92
	THRU/RT	B (12.3)	0.15	22	A (9.7)	0.26	44
Westbound	LT/THRU/RT	A (0.0)	0.01	0	C (28.8)	0.03	9
Northbound	LT/THRU/RT	A (8.5)	0.24	m73	A (9.5)	0.27	m106
Southbound	LT/THRU/RT	A (8.1)	0.29	68	B (13.7)	0.34	129
Average Intersection LOS (delay in sec)		*A (9.5)*			*B (13.4)*		
Richmond Ave & Forest Ave							
Eastbound	LT	A (7.3)	0.11	21	A (6.5)	0.02	6
	THRU/RT	A (6.9)	0.35	65	A (6.8)	0.44	91
Westbound	LT	A (9.1)	0.28	42	B (17.9)	0.49	126
	THRU/RT	A (7.7)	0.26	56	B (12.1)	0.27	121
Northbound	LT/THRU/RT	B (15.3)	0.54	93	B (15.9)	0.55	98
Southbound	LT/THRU/RT	A (9.0)	0.05	10	A (9.0)	0.1	10

Average Intersection LOS (delay in sec)		*A (9.6)*			*B (12.0)*		
Existing Level of Service Summary (cont.)		**AM Peak Hour**			**PM Peak Hour**		
		LOS (delay in sec)	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**
Elmwood Ave & Forest Ave							
Eastbound	LT/THRU/RT	E (62.0)	0.94	#373	D (53.8)	0.9	#408
Westbound	LT/THRU/RT	C (26.9)	0.54	173	C (30.0)	0.53	223
Northbound	LT/THRU/RT	B (10.6)	0.43	124	B (14.4)	0.64	165
Southbound	LT/THRU	B (14.1)	0.32	80	B (16.2)	0.5	259
	RT	A (2.0)	0.17	7	A (2.4)	0.27	0
Average Intersection LOS (delay in sec)		*C (27.7)*			*C (24.5)*		
Forest Ave & Granger Pl/Penhurst Pk							
Eastbound	LT/THRU	a (7.7)	0	0	a (8.7)	0.01	0
Westbound	THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	b (11.5)	0.07	5	b (14.2)	0.08	5
Southbound	LT	b (14.5)	0.06	5	c (20.1)	0.04	3
	RT	a (9.6)	0.01	0	b (11.2)	0.03	3
Forest Ave & Lincoln Pkwy (West)							
Eastbound	LT/THRU/RT	a (10.0)	0.41	48	b (11.2)	0.48	65
Westbound	LT/THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	a (0.0)	0	0	a (0.0)	0	0
Southbound	LT/THRU/RT	a (8.4)	0.05	5	a (8.7)	0.08	5
Forest Ave & Lincoln Pkwy (Central)							
Eastbound	LT/THRU/RT	c (15.9)	0.53	78	c (18.2)	0.61	105
Westbound	LT/THRU/RT	c (15.2)	0.5	70	c (17.9)	0.6	100
Northbound	LT/THRU/RT	b (14.2)	0.43	53	b (14.5)	0.43	53
Southbound	LT/THRU/RT	b (13.2)	0.38	45	b (12.8)	0.31	33
Forest Ave & Lincoln Pkwy (East)							
Eastbound	THRU/RT	n/a			n/a		
Westbound	LT/THRU	b (10.9)	0.41	50	b (12.8)	0.49	68
Northbound	LT/RT	a (9.3)	0.26	25	b (10.6)	0.33	38

X - signalized intersection LOS

x- unsignalized intersection LOS

n/a - no conflicting movement, therefore no delays

m - volume for 95th % queue is metered by upstream signal

- 95th % volume exceeds capacity, queue may be longer

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3. No-Build Conditions

a. Background Growth

The Project is expected to be completely operational in 2017. There is a hotel expected to be operational at approximately the same time as the Project within the H.H. Richardson Complex. The Hotel Henry is expected to have 88 guest rooms with dining and meeting space. Using the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 9th Edition, the traffic expected to be generated by the hotel was estimated for the typical AM and PM peak periods as shown below:

Table 3-1: Hotel Henry Trip Generation

	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out
Hotel Henry	47	28	19	53	27	26

Based on the location of the hotel within the complex, it is assumed for the purposes of this study that all traffic will enter and exit using the entrance off Forest Avenue opposite Richmond Avenue. Most traffic to the hotel will be regional and most likely be traveling via major highways such as the Scajaquada Expressway. Since there is access to the Scajaquada Expressway from Elmwood Avenue to the east and Grant Street to the west, an equally split distribution along Forest Avenue is assumed for hotel-generated traffic.

Based on information provided by the GBNRTC, a compounded growth rate of 1.25% was applied to the existing traffic volumes to derive 2017 background volumes that account for any unknown development that may occur in the area outside of the Hotel Henry. The background traffic was added to the estimated trips generated by the Hotel Henry to develop the future no-build condition volumes.

Figures 3-1 and 3-2 show the 2017 future no-build condition AM and PM peak hour volumes. More detailed information regarding the development of the no-build conditions volumes are included in **Appendix C**.

b. No-Build Analyses

A capacity analysis was performed for the study area using the 2017 no-build traffic volumes with existing roadway and intersection geometry information. **Tables 3-2 and 3-3** show the LOS, delay in seconds, volume to capacity ratio, and maximum queues for each lane group of each study intersection during the AM and PM peak hour no-build conditions.

The only anticipated increase in delay that results in a change in LOS is expected to occur during the PM peak hour eastbound on Rockwell Avenue at Elmwood Avenue from a LOS A to a LOS B (0.4 seconds of delay increase) and eastbound on Forest Avenue at Elmwood Avenue from a LOS D to a LOS E (12.6 seconds of delay increase). These increases are minor but are enough to cross the threshold for LOS ratings and do not result in a change of LOS for either intersection.

Table 3-2: No-Build Condition Level of Service Summary – AM Peak Hour

AM Peak Hour Level of Service Summary		Existing			No-Build		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Elmwood Ave & Bird Ave							
Eastbound	LT/RT	B (16.1)	0.13	13	B (16.1)	0.13	13
Westbound	LT/RT	A (9.8)	0.06	3	A (9.8)	0.06	3
Northbound	THRU	A (7.9)	0.35	133	A (8.0)	0.35	135
Southbound	THRU	A (4.7)	0.25	m57	A (4.7)	0.25	m58
Average Intersection LOS (delay in sec)		*A (7.3)*			*A (7.3)*		
Elmwood Ave & Pano's Restaurant							
Westbound	LT/RT	b (13.4)	0.03	3	b (13.5)	0.03	3
Northbound	THRU/RT	n/a			n/a		
Southbound	LT/THRU	a (8.3)	0.01	0	a (8.3)	0.01	0
Elmwood Ave & Rockwell Rd							
Eastbound	LT	C (28.0)	0.18	38	C (27.6)	0.17	37
	THRU/RT	B (12.3)	0.15	22	B (12.4)	0.16	22

Westbound	LT/THRU/RT	A (0.0)	0.01	0	A (0.0)	0.01	0
Northbound	LT/THRU/RT	A (8.5)	0.24	m73	A (8.4)	0.25	m72
Southbound	LT/THRU/RT	A (8.1)	0.29	68	A (8.4)	0.3	74
Average Intersection LOS (delay in sec)		*A (9.5)*			*A (9.5)*		
AM Peak Hour Level of Service Summary (cont.)		**Existing**			**No-Build**		
		LOS (delay in sec)	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**
Richmond Ave & Forest Ave							
Eastbound	LT	A (7.3)	0.11	21	A (7.6)	0.14	26
	THRU/RT	A (6.9)	0.35	65	A (7.0)	0.35	66
Westbound	LT	A (9.1)	0.28	42	A (9.2)	0.28	43
	THRU/RT	A (7.7)	0.26	56	A (7.6)	0.29	59
Northbound	LT/THRU/RT	B (15.3)	0.54	93	B (15.7)	0.55	95
Southbound	LT/THRU/RT	A (9.0)	0.05	10	A (8.9)	0.11	17
Average Intersection LOS (delay in sec)		*A (9.6)*			*A (9.6)*		
Elmwood Ave & Forest Ave							
Eastbound	LT/THRU/RT	E (62.0)	0.94	#373	E (75.1)	1	#397
Westbound	LT/THRU/RT	C (26.9)	0.54	173	C (27.2)	0.55	175
Northbound	LT/THRU/RT	B (10.6)	0.43	124	B (10.6)	0.43	125
Southbound	LT/THRU	B (14.1)	0.32	80	B (13.9)	0.33	78
	RT	A (2.0)	0.17	7	A (1.8)	0.19	7
Average Intersection LOS (delay in sec)		*C (27.7)*			*C (31.4)*		
Forest Ave & Granger Pl/Penhurst Pk							
Eastbound	LT/THRU	a (7.7)	0	0	a (7.7)	0	0
Westbound	THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	b (11.5)	0.07	5	b (11.5)	0.08	5
Southbound	LT	b (14.5)	0.06	5	b (14.6)	0.06	5
	RT	a (9.6)	0.01	0	a (9.6)	0.01	0
Forest Ave & Lincoln Pkwy (West)							
Eastbound	LT/THRU/RT	a (10.0)	0.41	48	b (10.1)	0.42	50
Westbound	LT/THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	a (0.0)	0	0	a (0.0)	0	0
Southbound	LT/THRU/RT	a (8.4)	0.05	5	a (8.4)	0.05	5
Forest Ave & Lincoln Pkwy (Central)							
Eastbound	LT/THRU/RT	c (15.9)	0.53	78	c (16.0)	0.54	80
Westbound	LT/THRU/RT	c (15.2)	0.5	70	c (15.3)	0.51	70
Northbound	LT/THRU/RT	b (14.2)	0.43	53	b (14.2)	0.43	53
Southbound	LT/THRU/RT	b (13.2)	0.38	45	b (13.4)	0.39	45
Forest Ave & Lincoln Pkwy (East)							

Eastbound	THRU/RT	n/a			n/a		
Westbound	LT/THRU	b (10.9)	0.41	50	b (11.1)	0.42	50
Northbound	LT/RT	a (9.3)	0.26	25	a (9.4)	0.27	28

X - signalized intersection LOS
x- unsignalized intersection LOS
n/a - no conflicting movement, therefore no delays
m - volume for 95th % queue is metered by upstream signal
- 95th % volume exceeds capacity, queue may be longer

Table 3-3: No-Build Condition Level of Service Summary – PM Peak Hour

PM Peak Hour Level of Service Summary		Existing			No-Build		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Elmwood Ave & Bird Ave							
Eastbound	LT/RT	B (18.0)	0.1	24	B (18.0)	0.1	24
Westbound	LT/RT	B (16.0)	0.09	15	B (16.1)	0.09	15
Northbound	THRU	A (7.6)	0.42	184	A (7.9)	0.44	193
Southbound	THRU	A (3.3)	0.3	m51	A (3.2)	0.31	m50
Average Intersection LOS (delay in sec)		*A (6.4)*			*A (6.6)*		
Elmwood Ave & Pano's Restaurant							
Westbound	LT/RT	c (15.3)	0.05	5	c (16.0)	0.06	5
Northbound	THRU/RT	n/a			n/a		
Southbound	LT/THRU	a (8.9)	0.02	3	a (8.9)	0.02	3
Elmwood Ave & Rockwell Rd							
Eastbound	LT	C (34.2)	0.33	92	C (33.9)	0.32	93
	THRU/RT	A (9.7)	0.26	44	B (10.1)	0.29	45
Westbound	LT/THRU/RT	C (28.8)	0.03	9	C (28.8)	0.03	9
Northbound	LT/THRU/RT	A (9.5)	0.27	m106	A (9.5)	0.3	m104
Southbound	LT/THRU/RT	B (13.7)	0.34	129	B (14.0)	0.36	136
Average Intersection LOS (delay in sec)		*B (13.4)*			*B (13.5)*		
Richmond Ave & Forest Ave							
Eastbound	LT	A (6.5)	0.02	6	A (6.7)	0.04	12
	THRU/RT	A (6.8)	0.44	91	A (7.4)	0.48	97
Westbound	LT	B (17.9)	0.49	126	B (19.1)	0.54	123
	THRU/RT	B (12.1)	0.27	121	B (12.0)	0.3	122
Northbound	LT/THRU/RT	B (15.9)	0.55	98	B (17.1)	0.58	103
Southbound	LT/THRU/RT	A (9.0)	0.1	10	A (9.4)	0.22	15
Average Intersection LOS (delay in sec)		*B (12.0)*			*B (12.5)*		
Elmwood Ave & Forest Ave							
Eastbound	LT/THRU/RT	D (53.8)	0.9	#408	E (66.4)	0.97	#445
Westbound	LT/THRU/RT	C (30.0)	0.53	223	C (31.1)	0.56	230

Northbound	LT/THRU/RT	B (14.4)	0.64	165	B (14.7)	0.66	168
Southbound	LT/THRU	B (16.2)	0.5	259	B (16.1)	0.51	265
	RT	A (2.4)	0.27	0	A (2.5)	0.29	3
Average Intersection LOS (delay in sec)		*C (24.5)*			*C (27.6)*		

PM Peak Hour Level of Service Summary (cont.)		**Existing**			**No-Build**		
		LOS (delay in sec)	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**
Forest Ave & Granger Pl/Penhurst Pk							
Eastbound	LT/THRU	a (8.7)	0.01	0	a (8.7)	0.01	0
Westbound	THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	b (14.2)	0.08	5	b (14.8)	0.08	8
Southbound	LT	c (20.1)	0.04	3	c (20.3)	0.04	3
	RT	b (11.2)	0.03	3	b (11.2)	0.03	3
Forest Ave & Lincoln Pkwy (West)							
Eastbound	LT/THRU/RT	b (11.2)	0.48	65	b (11.5)	0.49	68
Westbound	LT/THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	a (0.0)	0	0	a (0.0)	0	0
Southbound	LT/THRU/RT	a (8.7)	0.08	5	a (8.8)	0.08	5
Forest Ave & Lincoln Pkwy (Central)							
Eastbound	LT/THRU/RT	c (18.2)	0.61	105	c (18.2)	0.63	110
Westbound	LT/THRU/RT	c (17.9)	0.6	100	c (18.5)	0.61	105
Northbound	LT/THRU/RT	b (14.5)	0.43	53	b (14.7)	0.44	55
Southbound	LT/THRU/RT	b (12.8)	0.31	33	b (13.1)	0.32	35
Forest Ave & Lincoln Pkwy (East)							
Eastbound	THRU/RT	n/a			n/a		
Westbound	LT/THRU	b (12.8)	0.49	68	b (13.1)	0.51	70
Northbound	LT/RT	b (10.6)	0.33	38	b (10.8)	0.34	38

X - signalized intersection LOS

x- unsignalized intersection LOS

n/a - no conflicting movement, therefore no delays

m - volume for 95th % queue is metered by upstream signal

- 95th % volume exceeds capacity, queue may be longer

The output files from the no-build condition Synchro models are included in **Appendix B**.

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4. Build Conditions

a. Site Development

As stated in Section 1.a, the Project is proposed to be a five-story structure with the upper two floors stepped back. The Project contains 57 condominium apartments with 7,500 square feet of commercial space on the first floor, as well as underground parking spaces to accommodate residents and the commercial space. The site will have two ingress and egress points; one located on Forest Avenue and one on Elmwood Avenue. The Project will also include the demolition of 14 buildings currently on site that contain residential units and commercial space.

The Project will include no fewer than a total of 140 off-street parking spaces, to be contained within two levels beneath the proposed building. The lower level (accessible from Forest Avenue) will contain approximately 90 spaces. The second level (accessible from Elmwood Avenue) will contain approximately 50 parking spaces. The lower parking area accessible from Forest Avenue will contain approximately 50 spaces available for condominium owners and approximately 40 parking spaces available for retail customers.

b. Trip Generation

Using the ITE Trip Generation Manual, the traffic associated with the Project were estimated. Land use code 230 – Townhomes/Condominiums was used to estimate the traffic associated with the 57 residential units. At the time of this analysis, the exact use of the three separate commercial spaces has not been finalized. For purposes of developing a conservatively high trip generation estimate for the Project, the trip generation for both land use code 931 – Quality Restaurant and code 826 – Specialty Retail Center was considered.

While a Quality Restaurant use would add 6 more trips during the AM peak hour, three Specialty Retail uses would contribute to a higher PM peak hour trip value. Therefore, for the purposes of this analysis, the commercial area is assumed to

consist of three separate Specialty Retail uses. **Table 4-1** shows the estimated trip generation summary for the proposed development.

Table 4-1: Trip Generation Summary

ITE Land Use Code	ITE Land Use Code Description	Peak Hour	Estimated Trips	Entering Trips	Exiting Trips
230	Townhomes/Condos	AM	33	6	27
		PM	38	25	13
826	Specialty Retail Center	AM	0	0	0
		PM	81	36	45

AM Peak Hour		PM Peak Hour	
Entering	Exiting	Entering	Exiting
6	27	61	58

There are 14 properties currently on-site, which contain residential and commercial spaces that will be demolished as part of the Project. These properties currently, or have in the recent past, generate traffic in the study area that will be removed when the properties are demolished. To be conservative, and since detailed information regarding all of the uses is not available, the current traffic associated with these properties is not credited in this analysis.

c. Trip Distribution

The proposed trips were distributed throughout the study intersection based on the access to the site used and existing traffic patterns. While there are on-street parking spaces that may be available for residents and visitors to the proposed development, to be conservative, it is assumed all trips generated by the proposed development will utilize the on-site parking. As noted in Section 4.a., all commercial trips will use Forest Avenue. Since the residential parking spaces are close to being equally split between the access points, the trips were split equally between them.

	Entering	Exiting	Entering	Exiting
AM Peak Hour	3	13	3	14
PM Peak Hour	48	51	13	7

The proposed AM and PM peak hour vehicle distributions and the corresponding trip volumes are included in **Appendix C**.

d. Build Volumes

The distributed proposed trips were added to the 2017 no-build volumes to create the future build condition volumes. **Figures 4-1 and 4-2** show the future build condition AM and PM peak hour volumes.

e. Build Analyses

Future build condition Synchro models were created to compare to the existing and future no-build condition models to determine any potential impacts from traffic generated by the proposed development. **Tables 4-2 and 4-3**, starting on page 4-5, show the LOS, delay in seconds, volume to capacity ratio, and maximum queues for each lane group of each study intersection during the AM and PM peak hour existing, future no-build, and future build scenarios for quick comparison.

From existing through the future build scenario, there are no changes in LOS for any approaches to any study intersections during the AM peak hour. The vehicles exiting the proposed access points on Elmwood Avenue and Forest Avenue are expected to have a LOS B with minimal delays on Elmwood and Forest Avenues.

During the PM peak hour, the delays on the eastbound approach of Forest Avenue at Elmwood Avenue continue to increase resulting in a LOS F (15.8 second increase). There is also a 0.8 second increase in delay on the northbound approach of the center Lincoln Parkway at Forest Avenue. This increase is minimal but occurs right at the threshold from a LOS B to LOS C, which is still

considered acceptable. Similar to the AM peak hour, the proposed access points will experience LOS B.

In order to mitigate the increase in delay at the intersection of Elmwood Avenue and Forest Avenue, the signal operations along Elmwood Avenue could be optimized with 100 second cycle lengths versus the current 80 second cycle lengths. This change would reduce delays on Forest Avenue at Elmwood Avenue to acceptable levels, while not significantly impacting the operations of the other signals along Elmwood Avenue.

Table 4-4 on page 4-11 shows the LOS, delay in seconds, volume to capacity ratio, and maximum queues during the PM peak hour with and without the proposed signal timing changes along Elmwood Avenue.

Table 4-2: AM Peak Hour Level of Service Summary with Future

AM Peak Hour Level of Service Summary		Existing			No-Build			Future		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Elmwood Ave & Bird Ave										
Eastbound	LT/RT	B (16.1)	0.13	13	B (16.1)	0.13	13	B (16.1)	0.13	13
Westbound	LT/RT	A (9.8)	0.06	3	A (9.8)	0.06	3	A (9.8)	0.06	3
Northbound	THRU	A (7.9)	0.35	133	A (8.0)	0.35	135	A (8.0)	0.36	136
Southbound	THRU	A (4.7)	0.25	m57	A (4.7)	0.25	m58	A (4.9)	0.26	m61
Average Intersection LOS (delay in sec)		*A (7.3)*			*A (7.3)*			*A (7.3)*		
Elmwood Ave & Pano's Restaurant										
Westbound	LT/RT	b (13.4)	0.03	3	b (13.5)	0.03	3	b (13.6)	0.03	3
Northbound	THRU/RT	n/a			n/a			n/a		
Southbound	LT/THRU	a (8.3)	0.01	0	a (8.3)	0.01	0	a (8.3)	0.01	0
Elmwood Ave & Rockwell Rd										
Eastbound	LT	C (28.0)	0.18	38	C (27.6)	0.17	37	C (27.6)	0.17	37
	THRU/RT	B (12.3)	0.15	22	B (12.4)	0.16	22	B (12.4)	0.16	22
Westbound	LT/THRU/RT	A (0.0)	0.01	0	A (0.0)	0.01	0	A (0.0)	0.01	0
Northbound	LT/THRU/RT	A (8.5)	0.24	m73	A (8.4)	0.25	m72	A (8.7)	0.25	m76
Southbound	LT/THRU/RT	A (8.1)	0.29	68	A (8.4)	0.3	74	A (8.4)	0.3	74
Average Intersection LOS (delay in sec)		*A (9.5)*			*A (9.5)*			*A (9.7)*		

AM Peak Hour Level of Service Summary (cont.)		Existing			No-Build			Future		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Richmond Ave & Forest Ave										
Eastbound	LT	A (7.3)	0.11	21	A (7.6)	0.14	26	A (7.6)	0.14	26
	THRU/RT	A (6.9)	0.35	65	A (7.0)	0.35	66	A (7.0)	0.36	66
Westbound	LT	A (9.1)	0.28	42	A (9.2)	0.28	43	A (9.2)	0.28	43
	THRU/RT	A (7.7)	0.26	56	A (7.6)	0.29	59	A (7.7)	0.29	61
Northbound	LT/THRU/RT	B (15.3)	0.54	93	B (15.7)	0.55	95	B (15.7)	0.55	95
Southbound	LT/THRU/RT	A (9.0)	0.05	10	A (8.9)	0.11	17	A (8.9)	0.11	17
Average Intersection LOS (delay in sec)		*A (9.6)*			*A (9.6)*			*A (9.7)*		
Elmwood Ave & Forest Ave										
Eastbound	LT/THRU/RT	E (62.0)	0.94	#373	E (75.1)	1	#397	E (75.7)	1	#399
Westbound	LT/THRU/RT	C (26.9)	0.54	173	C (27.2)	0.55	175	C (27.6)	0.55	177
Northbound	LT/THRU/RT	B (10.6)	0.43	124	B (10.6)	0.43	125	B (10.8)	0.44	129
Southbound	LT/THRU	B (14.1)	0.32	80	B (13.9)	0.33	78	B (13.9)	0.33	79
	RT	A (2.0)	0.17	7	A (1.8)	0.19	7	A (1.8)	0.19	7
Average Intersection LOS (delay in sec)		*C (27.7)*			*C (31.4)*			*C (31.6)*		
Forest Ave & Granger Pl/Penhurst Pk										
Eastbound	LT/THRU	a (7.7)	0	0	a (7.7)	0	0	a (7.7)	0	0
Westbound	THRU/RT	n/a			n/a	0		n/a		
Northbound	LT/THRU/RT	b (11.5)	0.07	5	b (11.5)	0.08	5	b (11.6)	0.08	5
Southbound	LT	b (14.5)	0.06	5	b (14.6)	0.06	5	b (14.8)	0.06	5
	RT	a (9.6)	0.01	0	a (9.6)	0.01	0	a (9.6)	0.01	0
Forest Ave & Lincoln Pkwy (West)										
Eastbound	LT/THRU/RT	a (10.0)	0.41	48	b (10.1)	0.42	50	b (10.4)	0.43	55
Westbound	LT/THRU/RT	n/a			n/a			n/a		

Northbound	LT/THRU/RT	a (0.0)	0	0	a (0.0)	0	0	a (0.0)	0	0
Southbound	LT/THRU/RT	a (8.4)	0.05	5	a (8.4)	0.05	5	a (8.5)	0.05	5
AM Peak Hour Level of Service Summary (cont.)		**Existing**			**No-Build**			**Future**		
		LOS (delay in sec)	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**
Forest Ave & Lincoln Pkwy (Central)										
Eastbound	LT/THRU/RT	c (15.9)	0.53	78	c (16.0)	0.54	80	c (16.5)	0.55	85
Westbound	LT/THRU/RT	c (15.2)	0.5	70	c (15.3)	0.51	70	c (15.5)	0.51	73
Northbound	LT/THRU/RT	b (14.2)	0.43	53	b (14.2)	0.43	53	b (14.3)	0.43	55
Southbound	LT/THRU/RT	b (13.2)	0.38	45	b (13.4)	0.39	45	b (13.6)	0.39	45
Forest Ave & Lincoln Pkwy (East)										
Eastbound	THRU/RT	n/a			n/a			n/a		
Westbound	LT/THRU	b (10.9)	0.41	50	b (11.1)	0.42	50	b (11.2)	0.42	53
Northbound	LT/RT	a (9.3)	0.26	25	a (9.4)	0.27	28	a (9.4)	0.27	28
Forest Ave & Forest Access										
Eastbound	THRU/RT							n/a		
Westbound	LT/THRU							a (7.8)	0	0
Northbound	LT/RT							b (11.1)	0.02	3
Elmwood Ave & Elmwood Access										
Westbound	LT/RT							b (12.3)	0.03	3
Northbound	THRU/RT							n/a		
Southbound	LT/THRU							a (8.2)	0	0

X - signalized intersection LOS

x- unsignalized intersection LOS

n/a - no conflicting movement, therefore no delays

m - volume for 95th % queue is metered by upstream signal

- 95th % volume exceeds capacity, queue may be longer

Table 4-3: PM Peak Hour Level of Service Summary with Future

PM Peak Hour Level of Service Summary		Existing			No-Build			Future		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Elmwood Ave & Bird Ave										
Eastbound	LT/RT	B (18.0)	0.1	24	B (18.0)	0.1	24	B (18.0)	0.1	24
Westbound	LT/RT	B (16.0)	0.09	15	B (16.1)	0.09	15	B (16.1)	0.09	15
Northbound	THRU	A (7.6)	0.42	184	A (7.9)	0.44	193	A (8.1)	0.46	201
Southbound	THRU	A (3.3)	0.3	m51	A (3.2)	0.31	m50	A (3.3)	0.31	m50
Average Intersection LOS (delay in sec)		*A (6.4)*			*A (6.6)*			*A (6.7)*		
Elmwood Ave & Pano's Restaurant										
Westbound	LT/RT	c (15.3)	0.05	5	c (16.0)	0.06	5	c (16.4)	0.06	5
Northbound	THRU/RT	n/a			n/a			n/a		
Southbound	LT/THRU	a (8.9)	0.02	3	a (8.9)	0.02	3	a (9.0)	0.02	3
Elmwood Ave & Rockwell Rd										
Eastbound	LT	C (34.2)	0.33	92	C (33.9)	0.32	93	C (33.9)	0.32	93
	THRU/RT	A (9.7)	0.26	44	B (10.1)	0.29	45	B (10.1)	0.29	45
Westbound	LT/THRU/RT	C (28.8)	0.03	9	C (28.8)	0.03	9	C (28.8)	0.03	9
Northbound	LT/THRU/RT	A (9.5)	0.27	m106	A (9.5)	0.3	m104	A (9.5)	0.3	m101
Southbound	LT/THRU/RT	B (13.7)	0.34	129	B (14.0)	0.36	136	B (14.1)	0.36	138
Average Intersection LOS (delay in sec)		*B (13.4)*			*B (13.5)*			*B (13.6)*		

PM Peak Hour Level of Service Summary (cont.)		Existing			No-Build			Future		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Richmond Ave & Forest Ave										
Eastbound	LT	A (6.5)	0.02	6	A (6.7)	0.04	12	A (6.8)	0.04	12
	THRU/RT	A (6.8)	0.44	91	A (7.4)	0.48	97	A (8.1)	0.51	108
Westbound	LT	B (17.9)	0.49	126	B (19.1)	0.54	123	B (19.8)	0.56	m127
	THRU/RT	B (12.1)	0.27	121	B (12.0)	0.3	122	B (12.1)	0.33	126
Northbound	LT/THRU/RT	B (15.9)	0.55	98	B (17.1)	0.58	103	B (17.1)	0.58	103
Southbound	LT/THRU/RT	A (9.0)	0.1	10	A (9.4)	0.22	15	A (9.4)	0.22	15
Average Intersection LOS (delay in sec)		*B (12.0)*			*B (12.5)*			*B (12.7)*		
Elmwood Ave & Forest Ave										
Eastbound	LT/THRU/RT	D (53.8)	0.9	#408	E (66.4)	0.97	#445	F (82.2)	1.03	#477
Westbound	LT/THRU/RT	C (30.0)	0.53	223	C (31.1)	0.56	230	C (33.3)	0.62	253
Northbound	LT/THRU/RT	B (14.4)	0.64	165	B (14.7)	0.66	168	B (15.5)	0.68	180
Southbound	LT/THRU	B (16.2)	0.5	259	B (16.1)	0.51	265	B (16.2)	0.53	269
	RT	A (2.4)	0.27	0	A (2.5)	0.29	3	A (2.4)	0.29	2
Average Intersection LOS (delay in sec)		*C (24.5)*			*C (27.6)*			*C (32.0)*		
Forest Ave & Granger Pl/Penhurst Pk										
Eastbound	LT/THRU	a (8.7)	0.01	0	a (8.7)	0.01	0	a (8.8)	0.01	0
Westbound	THRU/RT	n/a			n/a			n/a		
Northbound	LT/THRU/RT	b (14.2)	0.08	5	b (14.8)	0.08	8	c (15.6)	0.09	8
Southbound	LT	c (20.1)	0.04	3	c (20.3)	0.04	3	c (21.9)	0.05	5
	RT	b (11.2)	0.03	3	b (11.2)	0.03	3	b (11.4)	0.03	3
Forest Ave & Lincoln Pkwy (West)										
Eastbound	LT/THRU/RT	b (11.2)	0.48	65	b (11.5)	0.49	68	b (12.3)	0.53	80
Westbound	LT/THRU/RT	n/a			n/a			n/a		
Northbound	LT/THRU/RT	a (0.0)	0	0	a (0.0)	0	0	a (0.0)	0	0

Southbound	LT/THRU/RT	a (8.7)	0.08	5	a (8.8)	0.08	5	a (8.9)	0.08	8
PM Peak Hour Level of Service Summary (cont.)		**Existing**			**No-Build**			**Future**		
		LOS (delay in sec)	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**	**LOS (delay in sec)**	**v/c Ratio**	**95th % Queue (ft)**
Forest Ave & Lincoln Pkwy (Central)										
Eastbound	LT/THRU/RT	c (18.2)	0.61	105	c (18.2)	0.63	110	c (22.5)	0.7	140
Westbound	LT/THRU/RT	c (17.9)	0.6	100	c (18.5)	0.61	105	c (21.1)	0.67	125
Northbound	LT/THRU/RT	b (14.5)	0.43	53	b (14.7)	0.44	55	c (15.5)	0.45	58
Southbound	LT/THRU/RT	b (12.8)	0.31	33	b (13.1)	0.32	35	b (13.6)	0.34	35
Forest Ave & Lincoln Pkwy (East)										
Eastbound	THRU/RT	n/a			n/a			n/a		
Westbound	LT/THRU	b (12.8)	0.49	68	b (13.1)	0.51	70	b (14.3)	0.55	85
Northbound	LT/RT	b (10.6)	0.33	38	b (10.8)	0.34	38	b (11.2)	0.35	40
Forest Ave & Forest Access										
Eastbound	THRU/RT							n/a		
Westbound	LT/THRU							a (8.1)	0.02	3
Northbound	LT/RT							b (13.0)	0.11	10
Elmwood Ave & Elmwood Access										
Westbound	LT/RT							b (14.5)	0.02	3
Northbound	THRU/RT							n/a		
Southbound	LT/THRU							a (8.6)	0.01	0

X - signalized intersection LOS

x- unsignalized intersection LOS

n/a - no conflicting movement, therefore no delays

m - volume for 95th % queue is metered by upstream signal

- 95th % volume exceeds capacity, queue may be longer

Table 4-4: PM Peak Hour Future Condition LOS Summary with Mitigation Measures

PM Peak Hour Level of Service Summary		Future			Future w/ Mitigation		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Elmwood Ave & Bird Ave							
Eastbound	LT/RT	B (18.0)	0.1	24	B (11.1)	0.08	17
Westbound	LT/RT	B (16.1)	0.09	15	A (9.8)	0.07	10
Northbound	THRU	A (8.1)	0.46	201	B (10.4)	0.51	213
Southbound	THRU	A (3.3)	0.31	m50	A (4.5)	0.35	m65
Average Intersection LOS (delay in sec)		*A (6.7)*			*A (8.1)*		
Elmwood Ave & Pano's Restaurant							
Westbound	LT/RT	c (16.4)	0.06	5	c (16.4)	0.06	5
Northbound	THRU/RT	n/a			n/a		
Southbound	LT/THRU	a (9.0)	0.02	3	a (9.0)	0.02	3
Elmwood Ave & Rockwell Rd							
Eastbound	LT	C (33.9)	0.32	93	C (22.6)	0.25	70
	THRU/RT	B (10.1)	0.29	45	A (7.3)	0.24	36
Westbound	LT/THRU/RT	C (28.8)	0.03	9	B (19.2)	0.02	7
Northbound	LT/THRU/RT	A (9.5)	0.3	m101	A (8.1)	0.36	m78
Southbound	LT/THRU/RT	B (14.1)	0.36	138	B (14.7)	0.41	128
Average Intersection LOS (delay in sec)		*B (13.6)*			*B (12.1)*		
Richmond Ave & Forest Ave							
Eastbound	LT	A (6.8)	0.04	12	a (8.6)	0.04	15
	THRU/RT	A (8.1)	0.51	108	B (10.5)	0.48	164
Westbound	LT	B (19.8)	0.56	m127	B (12.7)	0.53	m111
	THRU/RT	B (12.1)	0.33	126	A (6.9)	0.3	m79
Northbound	LT/THRU/RT	B (17.1)	0.58	103	C (23.6)	0.55	157
Southbound	LT/THRU/RT	A (9.4)	0.22	15	B (12.4)	0.21	20
Average Intersection LOS (delay in sec)		*B (12.7)*			*B (12.7)*		
Elmwood Ave & Forest Ave							
Eastbound	LT/THRU/RT	F (82.2)	1.03	#477	D (40.4)	0.88	#354
Westbound	LT/THRU/RT	C (33.3)	0.62	253	C (23.1)	0.55	194
Northbound	LT/THRU/RT	B (15.5)	0.68	180	C (20.9)	0.81	#170
Southbound	LT/THRU	B (16.2)	0.53	269	B (16.9)	0.62	88
	RT	A (2.4)	0.29	2	A (1.5)	0.32	2
Average Intersection LOS (delay in sec)		*C (32.0)*			*C (22.8)*		

PM Peak Hour Level of Service Summary (cont.)		Future			Future w/ Mitigation		
		LOS (delay in sec)	v/c Ratio	95th % Queue (ft)	LOS (delay in sec)	v/c Ratio	95th % Queue (ft)
Forest Ave & Granger Pl/Penhurst Pk							
Eastbound	LT/THRU	a (8.8)	0.01	0	a (8.8)	0.01	0
Westbound	THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	c (15.6)	0.09	8	c (15.6)	0.09	8
Southbound	LT	c (21.9)	0.05	5	c (21.9)	0.05	5
	RT	b (11.4)	0.03	3	b (11.4)	0.03	3
Forest Ave & Lincoln Pkwy (West)							
Eastbound	LT/THRU/RT	b (12.3)	0.53	80	b (12.3)	0.53	80
Westbound	LT/THRU/RT	n/a			n/a		
Northbound	LT/THRU/RT	a (0.0)	0	0	a (0.0)	0	0
Southbound	LT/THRU/RT	a (8.9)	0.08	8	a (8.9)	0.08	8
Forest Ave & Lincoln Pkwy (Central)							
Eastbound	LT/THRU/RT	c (22.5)	0.7	140	c (22.5)	0.7	140
Westbound	LT/THRU/RT	c (21.1)	0.67	125	c (21.1)	0.67	125
Northbound	LT/THRU/RT	c (15.5)	0.45	58	c (15.5)	0.45	58
Southbound	LT/THRU/RT	b (13.6)	0.34	35	b (13.6)	0.34	35
Forest Ave & Lincoln Pkwy (East)							
Eastbound	THRU/RT	n/a			n/a		
Westbound	LT/THRU	b (14.3)	0.55	85	b (14.3)	0.55	85
Northbound	LT/RT	b (11.2)	0.35	40	b (11.2)	0.35	40
Forest Ave & Forest Access							
Eastbound	THRU/RT	n/a			n/a		
Westbound	LT/THRU	a (8.1)	0.02	3	a (8.1)	0.02	3
Northbound	LT/RT	b (13.0)	0.11	10	b (13.0)	0.11	10
Elmwood Ave & Elmwood Access							
Westbound	LT/RT	b (14.5)	0.02	3	b (14.5)	0.02	3
Northbound	THRU/RT	n/a			n/a		
Southbound	LT/THRU	a (8.6)	0.01	0	a (8.6)	0.01	0

X - signalized intersection LOS

x- unsignalized intersection LOS

n/a - no conflicting movement, therefore no delays

m - volume for 95th % queue is metered by upstream signal

- 95th % volume exceeds capacity, queue may be longer

f. Parking

In addition to the capacity analyses described in previous sections, a comparison of proposed on-site parking to the zoning code requirements was verified. As noted in Section 4.a., The Project will include no fewer than a total of 140 off-street parking spaces, to be contained within two levels beneath the proposed building. The lower level (accessible from Forest Avenue) will contain approximately 90 spaces. The second level (accessible from Elmwood Avenue) will contain approximately 50 parking spaces. The lower parking area accessible from Forest Avenue will contain approximately 50 spaces available for condominium owners and approximately 40 parking spaces available for retail customers.

The minimum 140 parking spaces will exceed the requirement under Code § 511-96(A) of 1 per dwelling. The Project's combined total of approximately 100 residential parking spaces will be at least twice the current City requirement. City Zoning Code § 511-96(B)("buildings other than dwellings") sets no minimum parking requirements for retail in the EB district. However, the Project will include approximately 40 retail parking spaces.

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5. Conclusions

This TIS evaluates the potential transportation impacts from a proposed mixed-use facility on the southeast corner of Elmwood Avenue and Forest Avenue in the City of Buffalo, New York. The Project contains 57 condominium apartments with 7,500 square feet of commercial space on the first floor, as well as underground parking spaces to accommodate residents and the commercial space. The site will have two ingress and egress points; one located on Forest Avenue and one on Elmwood Avenue.

The Project will include no fewer than a total of 140 off-street parking spaces, to be contained within two levels beneath the proposed building. The lower level (accessible from Forest Avenue) will contain approximately 90 spaces. The second level (accessible from Elmwood Avenue) will contain approximately 50 parking spaces. The lower parking area accessible from Forest Avenue will contain approximately 50 spaces available for condominium owners and approximately 40 parking spaces available for retail customers.

The minimum 140 parking spaces will exceed the requirement under Code §511-96(A) of 1 per dwelling. The Project's combined total of approximately 100 residential parking spaces will be at least twice the current City requirement. City Zoning Code § 511-96(B)("buildings other than dwellings") sets no minimum parking requirements for retail in the EB district. However, the Project will include 40 retail parking spaces.

The Project is expected to generate 33 trips during a typical AM peak hour and 119 trips during the PM peak hour. With the assumed distribution of these trips based on the allocation of on-site parking, access points on Elmwood Avenue and Forest Avenue, and existing traffic patterns, no significant impacts to the transportation system are expected with minor signal timing changes along Elmwood Avenue.

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Appendix A:

Volume Data

QUALITY COUNTS REPORT

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Intersectioı	Elmwood A	Rockwell Rd
City/State:	Buffalo	NY
QCJobNo:	13797501	
ClientID:		
Date:	5/3/2016	
Comments:		
PEAK HOUI	8:00 AM	
PEAK HOUI	9:00 AM	
PEAK 15-M	8:45 AM	
PEAK 15-M	9:00 AM	
PHF	0.95	

Lane Configuration:

	SIGNAL	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7		
		TR	LT							SIGNAL
EBLane7									LTR	WBLane1
EBLane6										WBLane2
EBLane5										WBLane3
EBLane4										WBLane4
EBLane3										WBLane5
EBLane2	L									WBLane6
EBLane1	TR									WBLane7
SIGNAL							LT	TR		
		NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	SIGNAL	

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
84	334	44	14	260	169	37	13	26	0	0	1	462	443	76	1	372	286	71	253

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
4.8	7.5	0	0	4.2	5.3	24.3	0	11.5	0	0	0	6.3	4.5	15.8	0	9.1	4.9	0	5.1

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
21	14	29	9

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	1	0	0	0	0	0	0	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	108	292	76	0	0	32	260	204	0	0	36	4	20	0	0	0	0	4	0	0	1036
Heavy Truc	0	32	0			0	12	12			16	0	4			0	0	0			76
Pedestrians		20					12					8					20				60
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0

ALL-VEHICLE VOLUMES

Time Perioı	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
7:00 AM	6	61	0	0	0	1	71	16	0	0	4	0	2	0	0	1	0	0	0	0	162	
7:15 AM	4	65	1	0	0	0	68	22	0	0	5	0	4	0	0	0	0	0	0	0	169	
7:30 AM	12	95	2	0	0	1	70	32	0	0	9	1	5	0	0	0	0	1	0	0	228	
7:45 AM	22	86	3	0	0	0	46	36	0	0	10	2	10	0	0	0	0	1	0	0	216	775
8:00 AM	13	91	4	0	0	0	64	45	0	0	11	3	9	0	0	0	0	0	0	0	240	853
8:15 AM	22	81	2	0	0	2	82	33	0	0	4	4	6	0	0	0	0	0	0	0	236	920
8:30 AM	22	89	19	0	0	4	49	40	0	0	13	5	6	0	0	0	0	0	0	0	247	939
8:45 AM	27	73	19	0	0	8	65	51	0	0	9	1	5	0	0	0	0	1	0	0	259	982

HEAVY-VEHICLE VOLUMES

Time Perioı	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	5	0	1	11	2	1	0	0	1	0	0	21
7:15 AM	0	3	0	0	3	3	3	0	0	0	0	0	12
7:30 AM	0	6	0	0	5	1	1	0	0	0	0	0	13
7:45 AM	0	7	0	0	3	2	2	0	0	0	0	0	14
8:00 AM	0	6	0	0	3	1	1	0	1	0	0	0	12
8:15 AM	1	9	0	0	3	3	1	0	1	0	0	0	18
8:30 AM	3	2	0	0	2	2	3	0	0	0	0	0	12
8:45 AM	0	8	0	0	3	3	4	0	1	0	0	0	19

PEDESTRIAN VOLUMES

Time Perioı	North	South	East	West	Total
7:00 AM	1	7	2	5	15
7:15 AM	1	3	1	1	6
7:30 AM	14	0	8	1	23
7:45 AM	6	2	6	5	19
8:00 AM	7	1	9	0	17
8:15 AM	1	3	2	3	9
8:30 AM	10	5	13	4	32
8:45 AM	3	5	5	2	15

BICYCLE VOLUMES

Time Perioı	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	0	0	0	0	0	0	1	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0

QUALITY COUNTS REPORT
==========

Intersectio Elmwood A Rockwell Rd
City/State: Buffalo NY
QCJobNo: 13797502
ClientID:
Date: 5/3/2016
Comments:

PEAK HOUI 5:00 PM
PEAK HOUI 6:00 PM
PEAK 15-M 5:15 PM
PEAK 15-M 5:30 PM
PHF 0.99

Lane Configuration:

	SIGNAL	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7				
		TR	LT									SIGNAL
EBLane7										LTR		WBLane1
EBLane6												WBLane2
EBLane5												WBLane3
EBLane4												WBLane4
EBLane3												WBLane5
EBLane2	L											WBLane6
EBLane1	TR											WBLane7
SIGNAL							LT	TR				
		NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	SIGNAL			

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
92	358	13	10	386	111	84	14	87	4	0	0	463	507	185	4	442	477	37	203

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	1.7	0	0	2.3	7.2	9.5	0	2.3	0	0	0	1.3	3.4	5.4	0	3.2	2.3	0	3.9

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
28	33	42	40

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	0	2	0	0	0	0	0	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	108	344	16	0	0	12	416	84	0	0	40	12	128	0	0	8	0	0	0	0	1168
Heavy Truc	0	0	0			0	0	8			4	0	4			0	0	0			16
Pedestrians		12					48					12					56				128
Bicycles	0	0	1			0	0	0			0	0	0			0	0	0			1

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
4:00 PM	25	97	1	0	0	2	56	29	0	0	24	6	29	0	0	1	2	0	0	0	272	
4:15 PM	24	96	1	0	0	0	73	43	0	0	30	9	34	0	0	1	0	0	0	0	311	
4:30 PM	19	70	6	0	0	0	95	16	0	0	36	11	36	0	0	0	0	0	0	0	289	
4:45 PM	11	91	1	0	0	0	106	24	0	0	13	8	11	0	0	1	0	0	0	0	266	1138
5:00 PM	16	104	1	0	0	2	93	18	0	0	31	6	19	0	0	1	0	0	0	0	291	1157
5:15 PM	27	86	4	0	0	3	104	21	0	0	10	3	32	0	0	2	0	0	0	0	292	1138
5:30 PM	26	81	5	0	0	0	92	37	0	0	20	3	24	0	0	1	0	0	0	0	289	1138
5:45 PM	23	87	3	0	0	5	97	35	0	0	23	2	12	0	0	0	0	0	0	0	287	1159

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	1	4	0	0	2	1	2	0	0	0	1	0	11
4:15 PM	0	2	0	0	1	4	3	0	1	0	0	0	11
4:30 PM	0	2	0	0	2	1	2	0	0	0	0	0	7
4:45 PM	0	2	0	0	3	2	3	0	0	0	0	0	10
5:00 PM	0	2	0	0	5	1	2	0	1	0	0	0	11
5:15 PM	0	0	0	0	0	2	1	0	1	0	0	0	4
5:30 PM	0	3	0	0	1	4	2	0	0	0	0	0	10
5:45 PM	0	1	0	0	3	1	3	0	0	0	0	0	8

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
4:00 PM	12	6	6	9	33
4:15 PM	13	11	11	6	41
4:30 PM	10	25	7	10	52
4:45 PM	11	10	13	6	40
5:00 PM	11	7	10	9	37
5:15 PM	12	3	14	3	32
5:30 PM	1	12	12	21	46
5:45 PM	4	11	6	7	28

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	1	0	0	0	0	0	0	0	0	0	1
5:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0

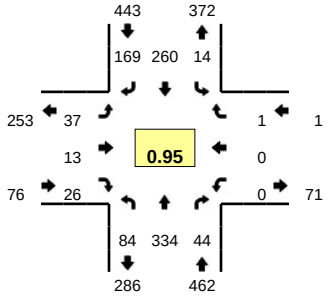
Type of peak hour being reported: Intersection Peak

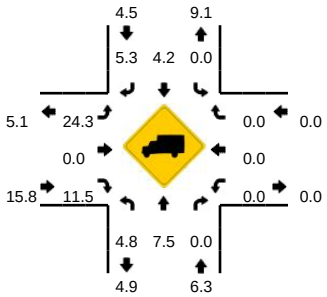
Method for determining peak hour: Total Entering Volume

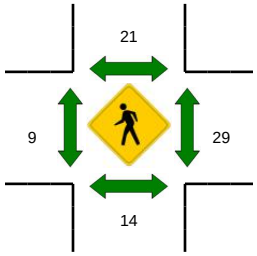
LOCATION: Elmwood Ave -- Rockwell Rd
CITY/STATE: Buffalo, NY

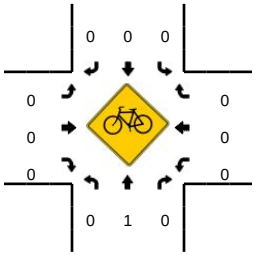
QC JOB #: 13797501
DATE: Tue, May 03 2016

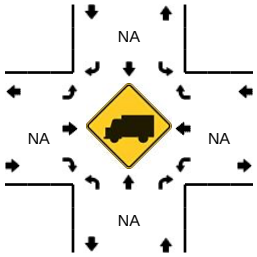
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM

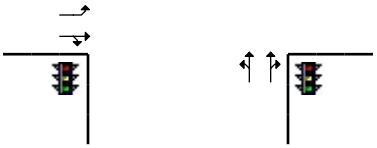


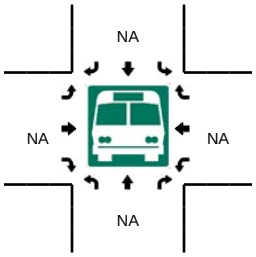












15-Min Count Period Beginning At	Elmwood Ave (Northbound)				Elmwood Ave (Southbound)				Rockwell Rd (Eastbound)				Rockwell Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	6	61	0	0	1	71	16	0	4	0	2	0	1	0	0	0	162	
7:15 AM	4	65	1	0	0	68	22	0	5	0	4	0	0	0	0	0	169	
7:30 AM	12	95	2	0	1	70	32	0	9	1	5	0	0	0	1	0	228	
7:45 AM	22	86	3	0	0	46	36	0	10	2	10	0	0	0	1	0	216	775
8:00 AM	13	91	4	0	0	64	45	0	11	3	9	0	0	0	0	0	240	853
8:15 AM	22	81	2	0	2	82	33	0	4	4	6	0	0	0	0	0	236	920
8:30 AM	22	89	19	0	4	49	40	0	13	5	6	0	0	0	0	0	247	939
8:45 AM	27	73	19	0	8	65	51	0	9	1	5	0	0	0	1	0	259	982

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	108	292	76	0	32	260	204	0	36	4	20	0	0	0	4	0	1036
Heavy Trucks	0	32	0		0	12	12		16	0	4		0	0	0		76
Pedestrians		20				12				8				20			60
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

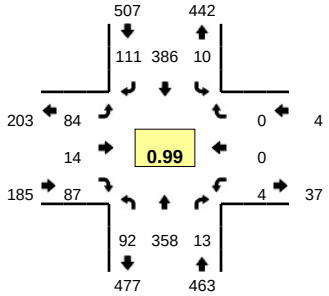
Type of peak hour being reported: Intersection Peak

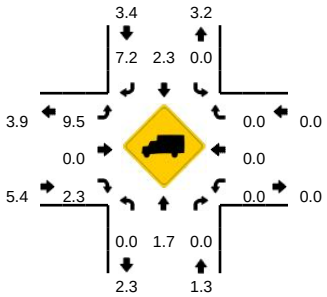
Method for determining peak hour: Total Entering Volume

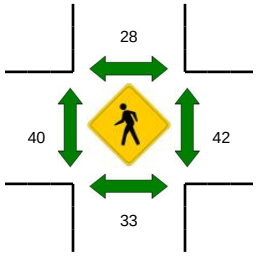
LOCATION: Elmwood Ave -- Rockwell Rd
CITY/STATE: Buffalo, NY

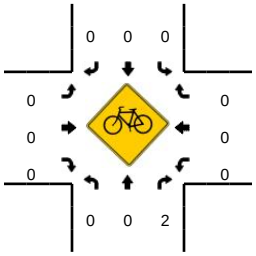
QC JOB #: 13797502
DATE: Tue, May 03 2016

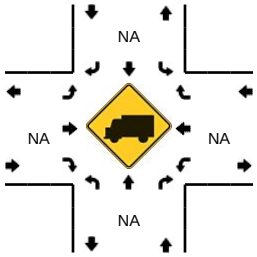
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

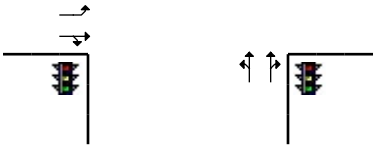


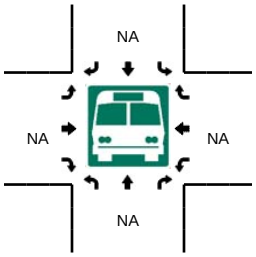












15-Min Count Period Beginning At	Elmwood Ave (Northbound)				Elmwood Ave (Southbound)				Rockwell Rd (Eastbound)				Rockwell Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	25	97	1	0	2	56	29	0	24	6	29	0	1	2	0	0	272	
4:15 PM	24	96	1	0	0	73	43	0	30	9	34	0	1	0	0	0	311	
4:30 PM	19	70	6	0	0	95	16	0	36	11	36	0	0	0	0	0	289	
4:45 PM	11	91	1	0	0	106	24	0	13	8	11	0	1	0	0	0	266	1138
5:00 PM	16	104	1	0	2	93	18	0	31	6	19	0	1	0	0	0	291	1157
5:15 PM	27	86	4	0	3	104	21	0	10	3	32	0	2	0	0	0	292	1138
5:30 PM	26	81	5	0	0	92	37	0	20	3	24	0	1	0	0	0	289	1138
5:45 PM	23	87	3	0	5	97	35	0	23	2	12	0	0	0	0	0	287	1159

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	108	344	16	0	12	416	84	0	40	12	128	0	8	0	0	0	1168
Heavy Trucks	0	0	0		0	0	8		4	0	4		0	0	0		16
Pedestrians		12				48				12				56			128
Bicycles	0	0	1		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

QUALITY COUNTS REPORT
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Intersectio Penhurst/C Forest Ave
City/State: Buffalo NY
QCJobNo: 13797503
ClientID:
Date: 5/3/2016
Comments:

PEAK HOUI 7:45 AM
PEAK HOUI 8:45 AM
PEAK 15-M 7:45 AM
PEAK 15-M 8:00 AM
PHF 0.87

Lane Configuration:

	STOP	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7							
		LR													
EBLane7												TR	WBLane1		
EBLane6													WBLane2		
EBLane5													WBLane3		
EBLane4													WBLane4		
EBLane3													WBLane5		
EBLane2													WBLane6		
EBLane1	LT												WBLane7		
									LTR						
		NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	STOP						

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
10	0	26	13	0	5	2	241	0	0	226	5	36	18	243	231	7	0	280	241

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
20	0	7.7	0	0	0	0	6.6	0	0	2.7	0	11.1	0	6.6	2.6	0	0	6.4	3.3

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
5	13	5	3

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
2	0	0	0	0	0	0	2	0	0	2	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	12	0	32	0	0	12	0	4	0	0	0	320	0	0	0	0	228	0	0	0	608
Heavy Truc	4	0	0			0	0	0			0	24	0			0	4	0			32
Pedestrians		20					16					4					8				48
Bicycles	0	0	0			0	0	0			0	0	0			0	1	0			1

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
7:00 AM	2	0	2	0	0	2	0	3	0	0	0	30	0	0	0	1	28	1	0	0	69	
7:15 AM	2	0	3	0	0	1	0	1	0	0	0	59	0	0	0	0	40	1	0	0	107	
7:30 AM	0	0	6	0	0	0	0	0	0	0	1	79	0	0	0	0	51	1	0	0	138	
7:45 AM	3	0	8	0	0	3	0	1	0	0	0	80	0	0	0	0	57	0	0	0	152	466
8:00 AM	3	0	5	0	0	5	0	3	0	0	0	51	0	0	0	0	54	0	0	0	121	518
8:15 AM	2	0	7	0	0	4	0	1	0	0	2	40	0	0	0	0	56	3	0	0	115	526
8:30 AM	2	0	6	0	0	1	0	0	0	0	0	70	0	0	0	0	59	2	0	0	140	528
8:45 AM	0	0	3	0	0	1	0	0	0	0	0	54	0	0	0	0	61	4	0	0	123	499

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
7:15 AM	0	0	0	0	0	0	0	3	0	0	5	0	8
7:30 AM	0	0	0	0	0	0	0	2	0	0	3	0	5
7:45 AM	1	0	0	0	0	0	0	6	0	0	1	0	8
8:00 AM	0	0	1	0	0	0	0	4	0	0	2	0	7
8:15 AM	1	0	0	0	0	0	0	3	0	0	2	0	6
8:30 AM	0	0	1	0	0	0	0	3	0	0	1	0	5
8:45 AM	0	0	0	0	0	0	0	4	0	0	1	0	5

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
7:00 AM	1	1	1	2	5
7:15 AM	1	0	0	0	1
7:30 AM	1	1	0	0	2
7:45 AM	4	5	2	1	12
8:00 AM	0	2	2	1	5
8:15 AM	0	4	1	1	6
8:30 AM	1	2	0	0	3
8:45 AM	0	0	1	0	1

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1
8:00 AM	0	0	0	0	0	0	0	1	0	0	1	0	2
8:15 AM	2	0	0	0	0	0	0	1	0	0	0	0	3
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	1

QUALITY COUNTS REPORT
==========

Intersectio Penhurst/C Forest Ave
City/State: Buffalo NY
QCJobNo: 13797504
ClientID:
Date: 5/3/2016
Comments:

PEAK HOUI 4:00 PM
PEAK HOUI 5:00 PM
PEAK 15-M 4:00 PM
PEAK 15-M 4:15 PM
PHF 0.91

Lane Configuration:

	STOP	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7					
		LR											
EBLane7										TR	WBLane1		
EBLane6											WBLane2		
EBLane5											WBLane3		
EBLane4											WBLane4		
EBLane3											WBLane5		
EBLane2											WBLane6		
EBLane1	LT										WBLane7		
								LTR					
		NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	STOP				

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
5	0	20	6	0	3	4	391	0	0	268	10	25	9	395	278	14	0	417	276

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	0	10	16.7	0	0	25	2.3	0	0	2.6	0	8	11.1	2.5	2.5	7.1	0	2.9	2.5

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
5	11	11	7

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
1	0	0	0	1	1	0	4	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	8	0	28	0	0	4	0	0	0	0	4	448	0	0	0	0	276	8	0	0	776
Heavy Truc	0	0	8			0	0	0			0	16	0			0	12	0			36
Pedestrians		8					12					12					8				40
Bicycles	0	0	0			0	1	0			0	3	0			0	0	0			4

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
4:00 PM	2	0	7	0	0	1	0	0	0	0	1	112	0	0	0	0	69	2	0	0	194	
4:15 PM	1	0	7	0	0	1	0	0	0	0	1	85	0	0	0	0	61	4	0	0	160	
4:30 PM	1	0	1	0	0	2	0	2	0	0	1	95	0	0	0	0	61	2	0	0	165	
4:45 PM	1	0	5	0	0	2	0	1	0	0	1	99	0	0	0	0	77	2	0	0	188	707
5:00 PM	3	0	5	0	0	0	0	1	0	0	1	98	0	0	0	0	57	1	1	0	167	680
5:15 PM	1	0	4	0	0	0	0	1	0	0	2	79	0	0	0	0	57	1	0	0	145	665
5:30 PM	1	0	3	0	0	2	0	5	0	0	4	101	0	1	0	0	66	4	0	0	187	687
5:45 PM	1	1	2	0	0	3	0	1	0	0	0	72	0	0	0	0	73	1	0	0	154	653

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	0	0	2	0	0	0	0	4	0	0	3	0	9
4:15 PM	0	0	0	0	0	0	0	2	0	0	2	0	4
4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
4:45 PM	0	0	0	1	0	0	1	2	0	0	2	0	6
5:00 PM	0	0	1	0	0	0	0	1	0	0	2	0	4
5:15 PM	0	0	0	0	0	0	0	2	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	1	0	0	2	0	3
5:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	2

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
4:00 PM	3	2	2	3	10
4:15 PM	0	7	4	2	13
4:30 PM	0	1	4	1	6
4:45 PM	2	1	1	1	5
5:00 PM	1	5	0	3	9
5:15 PM	0	3	0	1	4
5:30 PM	3	12	3	3	21
5:45 PM	6	6	1	0	13

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	0	0	0	0	1	0	0	3	0	0	0	0	4
4:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	1
4:30 PM	1	0	0	0	0	0	0	1	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	1	0	0	0	1	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	1	0	0	1	0	2

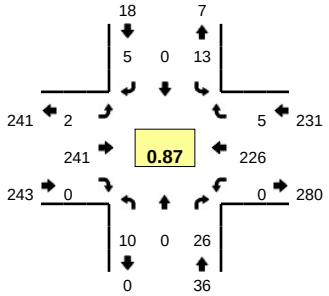
Type of peak hour being reported: Intersection Peak

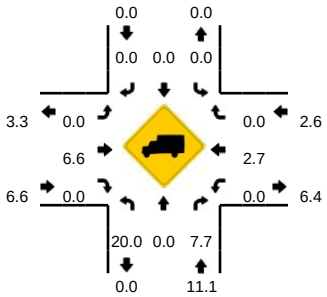
Method for determining peak hour: Total Entering Volume

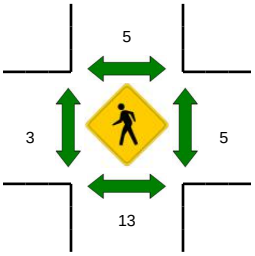
LOCATION: Penhurst/Granger -- Forest Ave
CITY/STATE: Buffalo, NY

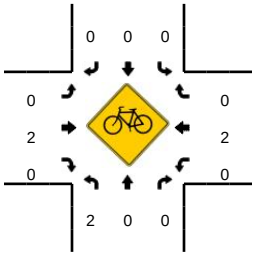
QC JOB #: 13797503
DATE: Tue, May 03 2016

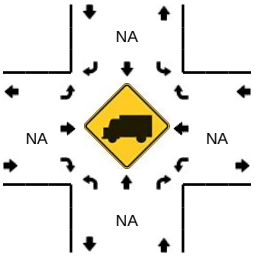
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

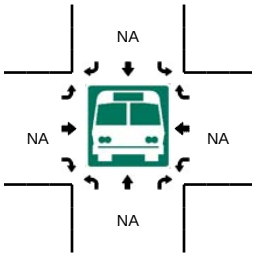












15-Min Count Period Beginning At	Penhurst/Granger (Northbound)				Penhurst/Granger (Southbound)				Forest Ave (Eastbound)				Forest Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	0	2	0	2	0	3	0	0	30	0	0	1	28	1	0	69	
7:15 AM	2	0	3	0	1	0	1	0	0	59	0	0	0	40	1	0	107	
7:30 AM	0	0	6	0	0	0	0	0	1	79	0	0	0	51	1	0	138	
7:45 AM	3	0	8	0	3	0	1	0	0	80	0	0	0	57	0	0	152	466
8:00 AM	3	0	5	0	5	0	3	0	0	51	0	0	0	54	0	0	121	518
8:15 AM	2	0	7	0	4	0	1	0	2	40	0	0	0	56	3	0	115	526
8:30 AM	2	0	6	0	1	0	0	0	0	70	0	0	0	59	2	0	140	528
8:45 AM	0	0	3	0	1	0	0	0	0	54	0	0	0	61	4	0	123	499

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	0	32	0	12	0	4	0	0	320	0	0	0	228	0	0	608
Heavy Trucks	4	0	0		0	0	0		0	24	0		0	4	0		32
Pedestrians		20				16				4				8			48
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

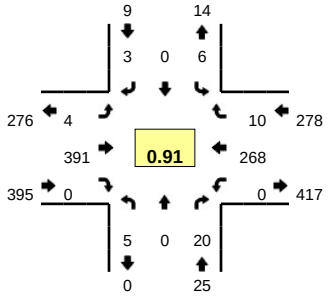
Type of peak hour being reported: Intersection Peak

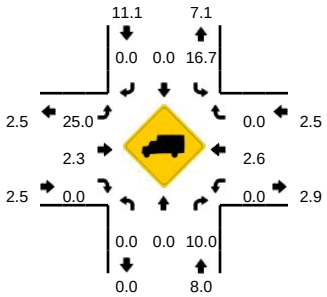
Method for determining peak hour: Total Entering Volume

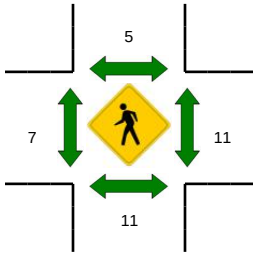
LOCATION: Penhurst/Granger -- Forest Ave
CITY/STATE: Buffalo, NY

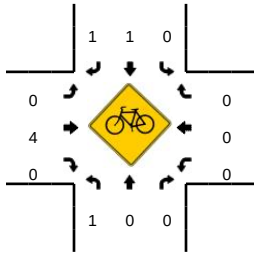
QC JOB #: 13797504
DATE: Tue, May 03 2016

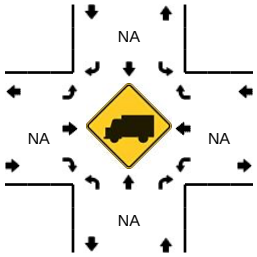
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

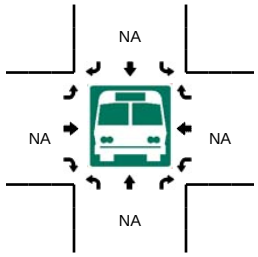












15-Min Count Period Beginning At	Penhurst/Granger (Northbound)				Penhurst/Granger (Southbound)				Forest Ave (Eastbound)				Forest Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	7	0	1	0	0	0	1	112	0	0	0	69	2	0	194	
4:15 PM	1	0	7	0	1	0	0	0	1	85	0	0	0	61	4	0	160	
4:30 PM	1	0	1	0	2	0	2	0	1	95	0	0	0	61	2	0	165	
4:45 PM	1	0	5	0	2	0	1	0	1	99	0	0	0	77	2	0	188	707
5:00 PM	3	0	5	0	0	0	1	0	1	98	0	0	0	57	1	1	167	680
5:15 PM	1	0	4	0	0	0	1	0	2	79	0	0	0	57	1	0	145	665
5:30 PM	1	0	3	0	2	0	5	0	4	101	0	1	0	66	4	0	187	687
5:45 PM	1	1	2	0	3	0	1	0	0	72	0	0	0	73	1	0	154	653

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	0	28	0	4	0	0	0	4	448	0	0	0	276	8	0	776
Heavy Trucks	0	0	8		0	0	0		0	16	0		0	12	0		36
Pedestrians		8				12				12				8			40
Bicycles	0	0	0		0	1	0		0	3	0		0	0	0		4
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

QUALITY COUNTS REPORT
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Intersectio	Elmwood A	Pano's Ent	Lane Configuration:												
City/State:	Buffalo	NY		SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7					
QCJobNo:	13797505			LT									STOP		
ClientID:			EBLane7								LR		WBLane1		
Date:	5/3/2016		EBLane6										WBLane2		
Comments:			EBLane5										WBLane3		
			EBLane4										WBLane4		
PEAK HOUI	7:30 AM		EBLane3										WBLane5		
PEAK HOUI	8:30 AM		EBLane2										WBLane6		
PEAK 15-M	8:15 AM		EBLane1										WBLane7		
PEAK 15-M	8:30 AM		STOP							TR					
PHF	0.94			NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1					

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	375	6	10	250	0	0	0	0	3	0	5	381	260	0	8	381	253	15	0

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	8.5	0	0	6.8	0	0	0	0	0	0	20	8.4	6.5	0	12.5	8.7	6.7	0	0

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
6	1	31	28

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	2	0	0	3	0	0	0	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	0	336	4	0	0	12	332	0	0	0	0	0	0	0	0	0	0	8	0	0	692
Heavy Truc	0	28	0			0	28	0			0	0	0			0	0	0			56
Pedestrians		4					4					8					24				40
Bicycles	0	1	0			0	2	0			0	0	0			0	0	0			3

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
7:00 AM	0	53	1	0	0	0	49	0	0	0	0	0	0	0	0	0	0	0	0	0	103	
7:15 AM	0	50	0	0	0	1	48	0	0	0	0	0	0	0	0	2	0	0	0	0	101	
7:30 AM	0	103	4	0	0	4	59	0	0	0	0	0	0	0	0	2	0	0	0	0	172	
7:45 AM	0	94	0	0	0	1	54	0	0	0	0	0	0	0	0	0	0	1	0	0	150	526
8:00 AM	0	94	1	0	0	1	54	0	1	0	0	0	0	0	0	1	0	2	0	0	154	577
8:15 AM	0	84	1	0	0	3	83	0	0	0	0	0	0	0	0	0	0	2	0	0	173	649
8:30 AM	0	92	3	0	0	1	57	0	0	0	0	0	0	0	0	0	0	1	0	0	154	631
8:45 AM	0	96	4	0	0	2	51	0	0	0	0	0	0	0	0	2	0	2	0	0	157	638

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	5	0	0	7	0	0	0	0	0	0	0	12
7:15 AM	0	3	0	0	3	0	0	0	0	0	0	0	6
7:30 AM	0	7	0	0	4	0	0	0	0	0	0	0	11
7:45 AM	0	8	0	0	4	0	0	0	0	0	0	1	13
8:00 AM	0	10	0	0	2	0	0	0	0	0	0	0	12
8:15 AM	0	7	0	0	7	0	0	0	0	0	0	0	14
8:30 AM	0	5	0	0	2	0	0	0	0	0	0	0	7
8:45 AM	0	6	1	0	2	0	0	0	0	0	0	1	10

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
7:00 AM	1	0	4	1	6
7:15 AM	0	0	3	1	4
7:30 AM	5	0	20	6	31
7:45 AM	0	0	2	15	17
8:00 AM	0	0	3	5	8
8:15 AM	1	1	6	2	10
8:30 AM	1	0	6	4	11
8:45 AM	0	0	0	5	5

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	0	0	2	0	0	0	0	0	0	0	3
8:30 AM	0	2	0	0	0	0	0	0	0	0	0	0	2
8:45 AM	0	1	0	0	3	0	0	0	0	0	0	0	4

QUALITY COUNTS REPORT
==========

Intersectio Elmwood A Pano's Ent
City/State: Buffalo NY
QCJobNo: 13797506
ClientID:
Date: 5/3/2016
Comments:

PEAK HOUI 5:00 PM
PEAK HOUI 6:00 PM
PEAK 15-M 5:15 PM
PEAK 15-M 5:30 PM
PHF 0.93

Lane Configuration:

	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7
	LT						
EBLane7							
EBLane6							
EBLane5							
EBLane4							
EBLane3							
EBLane2							
EBLane1							
STOP							TR
	NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1

		LR	STOP
			WBLane1
			WBLane2
			WBLane3
			WBLane4
			WBLane5
			WBLane6
			WBLane7

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
1	482	19	15	354	0	0	0	0	3	0	12	502	369	0	15	495	358	33	0

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	1.5	0	0	1.1	0	0	0	0	0	0	0	1.4	1.1	0	0	1.4	1.1	0	0

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
8	6	67	73

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	12	0	0	5	0	0	0	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	0	508	20	0	0	8	388	0	4	0	0	0	0	0	0	0	0	20	0	0	948
Heavy Truc	0	4	0			0	4	0			0	0	0			0	0	0			8
Pedestrians		4					8					76					48				136
Bicycles	0	5	0			0	1	0			0	0	0			0	0	0			6

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
4:00 PM	0	112	0	0	0	1	75	0	0	0	0	0	0	0	0	0	0	2	0	0	190	
4:15 PM	0	138	2	0	0	1	75	0	0	0	0	0	0	0	0	3	0	1	0	0	220	
4:30 PM	0	97	1	1	0	3	106	0	0	0	0	0	0	0	0	1	0	0	0	0	209	
4:45 PM	0	94	2	0	0	4	72	0	0	0	0	0	0	0	0	2	0	0	0	0	174	793
5:00 PM	0	133	4	0	0	3	78	0	0	0	0	0	0	0	0	0	0	3	0	0	221	824
5:15 PM	0	127	5	0	0	2	97	0	1	0	0	0	0	0	0	0	0	5	0	0	237	841
5:30 PM	0	130	5	1	0	3	91	0	0	0	0	0	0	0	0	1	0	2	0	0	233	865
5:45 PM	0	92	5	0	0	6	88	0	0	0	0	0	0	0	0	2	0	2	0	0	195	886

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	0	4	0	0	3	0	0	0	0	0	0	0	7
4:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
4:30 PM	0	2	0	0	3	0	0	0	0	0	0	0	5
4:45 PM	0	2	0	0	2	0	0	0	0	0	0	0	4
5:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	2
5:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
5:30 PM	0	3	0	0	1	0	0	0	0	0	0	0	4
5:45 PM	0	1	0	0	2	0	0	0	0	0	0	0	3

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
4:00 PM	6	1	11	9	27
4:15 PM	1	1	10	17	29
4:30 PM	0	0	7	21	28
4:45 PM	2	1	12	28	43
5:00 PM	1	0	11	14	26
5:15 PM	2	1	12	19	34
5:30 PM	3	5	20	21	49
5:45 PM	2	0	24	19	45

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	0	1	0	0	3	0	0	0	0	0	0	0	4
4:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	2
4:30 PM	0	1	0	0	3	0	0	0	0	0	0	0	4
4:45 PM	0	0	0	0	3	0	0	0	0	0	0	0	3
5:00 PM	0	3	0	0	1	0	0	0	0	0	0	0	4
5:15 PM	0	5	0	0	1	0	0	0	0	0	0	0	6
5:30 PM	0	3	0	0	1	0	0	0	0	0	0	0	4
5:45 PM	0	1	0	0	2	0	0	0	0	0	0	0	3

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

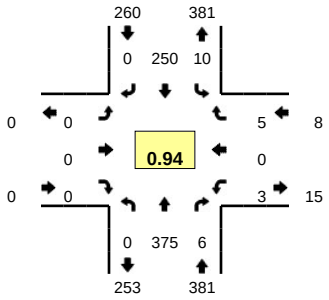
LOCATION: Elmwood Ave -- Pano's Ent

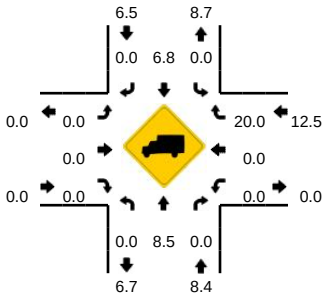
CITY/STATE: Buffalo, NY

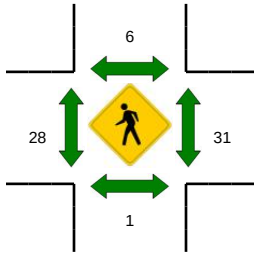
QC JOB #: 13797505

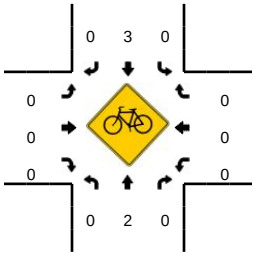
DATE: Tue, May 03 2016

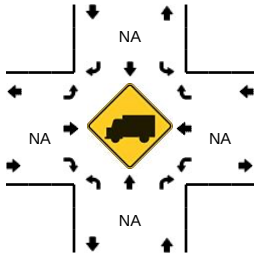
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

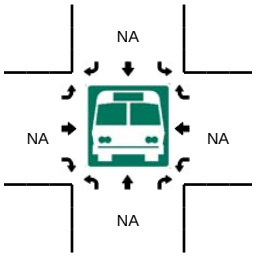












15-Min Count Period Beginning At	Elmwood Ave (Northbound)				Elmwood Ave (Southbound)				Pano's Ent (Eastbound)				Pano's Ent (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	53	1	0	0	49	0	0	0	0	0	0	0	0	0	0	103	
7:15 AM	0	50	0	0	1	48	0	0	0	0	0	0	2	0	0	0	101	
7:30 AM	0	103	4	0	4	59	0	0	0	0	0	0	2	0	0	0	172	
7:45 AM	0	94	0	0	1	54	0	0	0	0	0	0	0	0	1	0	150	526
8:00 AM	0	94	1	0	1	54	0	1	0	0	0	0	1	0	2	0	154	577
8:15 AM	0	84	1	0	3	83	0	0	0	0	0	0	0	0	2	0	173	649
8:30 AM	0	92	3	0	1	57	0	0	0	0	0	0	0	0	1	0	154	631
8:45 AM	0	96	4	0	2	51	0	0	0	0	0	0	2	0	2	0	157	638

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	336	4	0	12	332	0	0	0	0	0	0	0	0	8	0	692
Heavy Trucks	0	28	0		0	28	0		0	0	0		0	0	0		56
Pedestrians		4				4				8				24			40
Bicycles	0	1	0		0	2	0		0	0	0		0	0	0		3
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

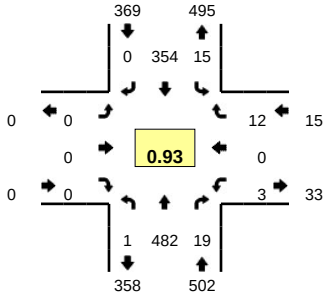
Type of peak hour being reported: Intersection Peak

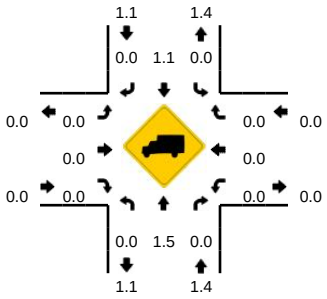
Method for determining peak hour: Total Entering Volume

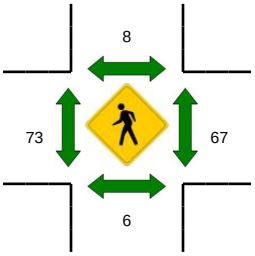
LOCATION: Elmwood Ave -- Pano's Ent
CITY/STATE: Buffalo, NY

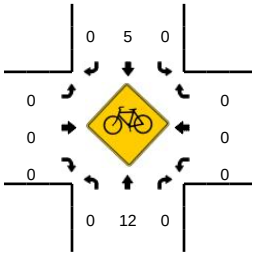
QC JOB #: 13797506
DATE: Tue, May 03 2016

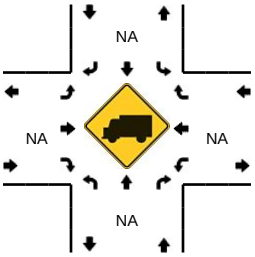
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

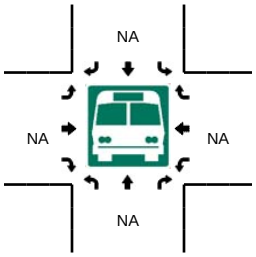












15-Min Count Period Beginning At	Elmwood Ave (Northbound)				Elmwood Ave (Southbound)				Pano's Ent (Eastbound)				Pano's Ent (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	112	0	0	1	75	0	0	0	0	0	0	0	0	2	0	190	
4:15 PM	0	138	2	0	1	75	0	0	0	0	0	0	3	0	1	0	220	
4:30 PM	0	97	1	1	3	106	0	0	0	0	0	0	1	0	0	0	209	
4:45 PM	0	94	2	0	4	72	0	0	0	0	0	0	2	0	0	0	174	793
5:00 PM	0	133	4	0	3	78	0	0	0	0	0	0	0	0	3	0	221	824
5:15 PM	0	127	5	0	2	97	0	1	0	0	0	0	0	0	5	0	237	841
5:30 PM	0	130	5	1	3	91	0	0	0	0	0	0	1	0	2	0	233	865
5:45 PM	0	92	5	0	6	88	0	0	0	0	0	0	2	0	2	0	195	886

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	508	20	0	8	388	0	4	0	0	0	0	0	0	20	0	948
Heavy Trucks	0	4	0		0	4	0		0	0	0		0	0	0		8
Pedestrians		4				8				76				48			136
Bicycles	0	5	0		0	1	0		0	0	0		0	0	0		6
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

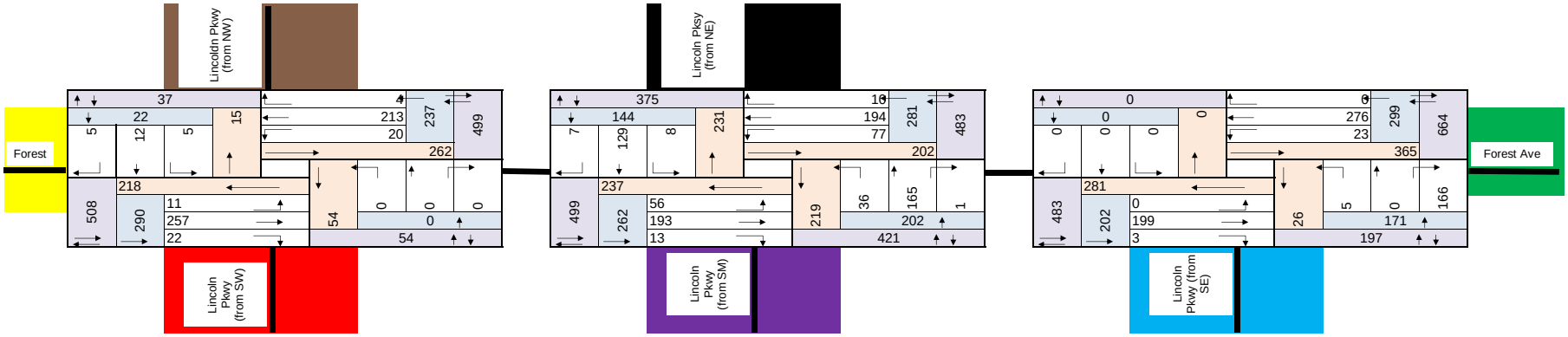
Location: Lincoln Pkwy & Forest Ave
Date: 5/3/2016
Site Code: 13797507

	Lincoln Pkwy Southbound							Forest Ave Westbound							(East) Lincoln Pkwy From Southeast							Lincoln Pkwy Northbound						
Start Time	Hard Right to (West) Lincoln Pkwy	Right	Bear Right to Lincoln Pkwy (One way)	Thru	Bear Left to (East) Lincoln Pkwy	Left	U-Turns	Right	Bear Right to (West) Lincoln Pkwy	Thru	Bear Left to Lincoln Pkwy (One way)	Left	Hard Left to (East) Lincoln Pkwy	U-Turns	Hard Right to Forest Ave	Bear Right to Lincoln Pkwy	Thru to (West) Lincoln Pkwy	Bear Left to Forest Ave	Left to Lincoln Pkwy (One way)	Hard Left to Lincoln Pkwy	U-Turns	Hard Right to (East) Lincoln Pkwy	Right	Thru	Bear Left to (West) Lincoln Pkwy	Left	Hard Left to Lincoln Pkwy (One way)	U-Turns
07:00 AM	0	0	0	20	0	1	0	0	0	24	7	8	0	0	15	0	0	0	0	0	0	0	0	30	0	4	0	0
07:15 AM	0	0	0	40	0	2	0	1	0	31	7	22	0	0	30	0	0	0	0	0	0	0	1	32	0	8	0	0
07:30 AM	0	4	0	49	0	1	0	0	0	39	13	17	0	0	45	0	0	1	0	0	0	0	0	35	0	7	0	0
07:45 AM	0	0	0	34	1	1	0	0	3	45	4	15	11	0	50	1	0	0	0	0	0	0	1	52	0	7	0	0
08:00 AM	0	2	0	24	1	1	0	3	0	42	2	24	4	0	40	2	0	0	0	0	0	0	0	44	1	8	0	0
08:15 AM	0	1	0	22	0	3	0	4	0	43	1	21	8	0	31	0	0	1	0	0	0	0	0	34	0	13	0	0
08:30 AM	0	1	0	27	0	1	1	2	1	42	1	8	7	0	44	2	0	1	0	0	0	0	2	27	0	14	0	0
08:45 AM	0	1	0	18	1	3	0	3	1	54	1	11	5	0	34	0	0	1	0	0	0	0	1	32	0	10	0	0
Total	**0**	**9**	**0**	**234**	**3**	**13**	**1**	**13**	**5**	**320**	**36**	**126**	**35**	**0**	**289**	**5**	**0**	**4**	**0**	**0**	**0**	**0**	**5**	**286**	**1**	**71**	**0**	**0**

	Lincoln Pkwy (One way) From Southwest							Forest Ave Eastbound							(West) Lincoln Pkwy From Northwest						
Start Time	Hard Right to Lincoln Pkwy	Right to (East) Lincoln Pkwy	Bear Right to Forest Ave	Bear Left to Lincoln Pkwy	Left to (West) Lincoln Pkwy	Hard Left to Forest Ave	U-Turns	Hard Right to Lincoln Pkwy (One way)	Right	Bear Right to (East) Lincoln Pkwy	Thru	Left	Hard Left to (West) Lincoln Pkwy	U-Turns	Hard Right to Forest Ave	Right to Lincoln Pkwy (One way)	Bear Right to Lincoln Pkwy	Thru to (East) Lincoln Pkwy	Bear Left to Forest Ave	Hard Left to Lincoln Pkwy	U-Turns
07:00 AM	0	0	0	0	0	0	0	1	2	0	22	9	1	0	0	2	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	9	0	0	42	12	1	0	2	3	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	4	6	0	56	14	4	0	0	1	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	8	5	1	51	18	4	0	3	3	0	0	3	0	0
08:00 AM	0	0	0	0	0	0	0	4	2	0	42	16	3	0	1	5	0	0	2	0	0
08:15 AM	0	0	0	0	0	0	0	6	0	0	38	8	0	0	1	3	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	7	3	0	45	16	5	0	2	4	0	0	0	1	0
08:45 AM	0	0	0	0	0	0	0	6	2	0	37	6	3	0	2	5	0	0	0	0	0
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**45**	**20**	**1**	**333**	**99**	**21**	**0**	**11**	**26**	**0**	**0**	**5**	**1**	**0**

Peak Hour: 7:15 AM - 8:15 AM
Peak 15-Min: 7:45 AM - 8:00 AM
PHF: 0.898

Used network peak hour 7:30-8:30



Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

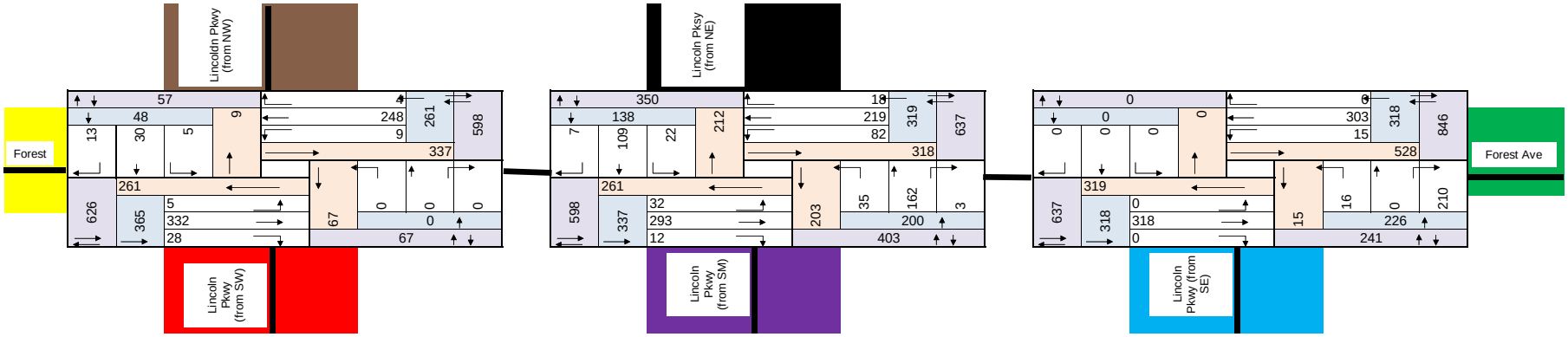
Location: Lincoln Pkwy & Forest Ave
Date: 5/3/2016
Site Code: 13797508

	Lincoln Pkwy Southbound							Forest Ave Westbound							(East) Lincoln Pkwy From Southeast							Lincoln Pkwy Northbound						
Start Time	Hard Right to (West) Lincoln Pkwy	Right	Bear Right to Lincoln Pkwy (One way)	Thru	Bear Left to (East) Lincoln Pkwy	Left	Peds	Right	Bear Right to (West) Lincoln Pkwy	Thru	Bear Left to Lincoln Pkwy (One way)	Left	Hard Left to (East) Lincoln Pkwy	Peds	Hard Right to Forest Ave	Bear Right to Lincoln Pkwy	Thru to (West) Lincoln Pkwy	Bear Left to Forest Ave	Left to Lincoln Pkwy (One way)	Hard Left to Lincoln Pkwy	Peds	Hard Right to (East) Lincoln Pkwy	Right	Thru	Bear Left to (West) Lincoln Pkwy	Left	Hard Left to Lincoln Pkwy (One way)	Peds
04:00 PM	0	0	0	19	0	5	5	2	0	53	0	17	1	6	43	6	0	0	1	0	1	0	2	30	0	10	0	1
04:15 PM	0	1	0	15	0	1	1	3	1	46	1	19	4	2	34	3	0	2	0	0	0	0	1	36	0	11	0	0
04:30 PM	0	0	0	21	1	13	0	3	0	51	2	14	3	5	47	2	0	5	0	0	1	0	1	43	0	4	1	1
04:45 PM	0	0	0	23	0	3	1	1	0	61	1	16	6	4	56	2	0	1	0	0	0	0	1	36	0	10	0	0
05:00 PM	0	3	0	21	0	4	2	1	0	48	3	16	2	3	55	1	0	0	1	0	2	0	2	42	0	6	0	2
05:15 PM	0	0	0	32	0	3	2	3	0	44	1	18	5	2	47	2	0	2	1	0	1	0	0	42	3	9	0	1
05:30 PM	0	2	0	34	0	6	5	6	0	50	0	26	6	5	54	1	0	3	1	0	4	0	0	47	0	11	0	4
05:45 PM	0	2	0	22	0	9	4	2	1	61	1	22	2	6	54	2	0	2	0	0	1	0	1	31	0	5	1	1
Total	**0**	**8**	**0**	**187**	**1**	**44**	**20**	**21**	**2**	**414**	**9**	**148**	**29**	**33**	**390**	**19**	**0**	**15**	**4**	**0**	**10**	**0**	**8**	**307**	**3**	**66**	**2**	**10**

	Lincoln Pkwy (One way) From Southwest							Forest Ave Eastbound							(West) Lincoln Pkwy From Northwest						
Start Time	Hard Right to Lincoln Pkwy	Right to (East) Lincoln Pkwy	Bear Right to Forest Ave	Bear Left to Lincoln Pkwy	Left to (West) Lincoln Pkwy	Hard Left to Forest Ave	Peds	Hard Right to Lincoln Pkwy (One way)	Right	Bear Right to (East) Lincoln Pkwy	Thru	Left	Hard Left to (West) Lincoln Pkwy	Peds	Hard Right to Forest Ave	Right to Lincoln Pkwy (One way)	Bear Right to Lincoln Pkwy	Thru to (East) Lincoln Pkwy	Bear Left to Forest Ave	Hard Left to Lincoln Pkwy	Peds
04:00 PM	0	0	0	0	0	0	1	8	5	0	78	16	2	5	5	7	0	0	0	1	5
04:15 PM	0	0	1	0	0	1	0	9	3	1	70	12	1	7	1	4	0	0	3	1	1
04:30 PM	0	0	0	0	1	0	1	3	1	0	64	17	1	5	3	6	0	0	4	4	0
04:45 PM	0	0	1	0	0	0	0	7	2	0	83	15	2	5	7	5	0	0	2	0	1
05:00 PM	0	0	0	0	0	0	2	12	3	0	73	12	0	9	3	7	0	0	1	1	2
05:15 PM	0	0	0	0	0	0	1	3	0	0	71	5	2	13	3	9	0	0	1	0	2
05:30 PM	0	0	0	0	0	0	4	6	4	0	78	7	1	13	5	6	0	0	0	1	5
05:45 PM	0	0	0	0	0	0	1	7	5	0	69	5	2	10	2	8	0	0	0	1	4
Total	**0**	**0**	**2**	**0**	**1**	**1**	**10**	**55**	**23**	**1**	**586**	**89**	**11**	**67**	**29**	**52**	**0**	**0**	**11**	**9**	**20**

Peak Hour: 4:45 PM - 5:45 PM
Peak 15-Min: 5:30 PM - 5:45 PM
PHF: 0.867

Actual Used Network Peak Hour: 5:00-6:00 PM



QUALITY COUNTS REPORT
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Intersectio Richmond / Forest Ave
City/State: Buffalo NY
QCJobNo: 13797509
ClientID:
Date: 5/3/2016
Comments:

PEAK HOUI 7:30 AM
PEAK HOUI 8:30 AM
PEAK 15-M 7:45 AM
PEAK 15-M 8:00 AM
PHF 0.92

Lane Configuration:

	SIGNAL	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7			
		LTR									SIGNAL
EBLane7										TR	WBLane1
EBLane6										L	WBLane2
EBLane5											WBLane3
EBLane4											WBLane4
EBLane3											WBLane5
EBLane2	L										WBLane6
EBLane1	TR										WBLane7
SIGNAL									LTR		
		NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	SIGNAL		

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
117	13	94	2	3	10	49	164	86	112	170	16	224	15	299	298	78	201	260	297

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
1.7	0	2.1	0	0	20	4.1	7.9	10.5	8	5.9	6.3	1.8	13.3	8	6.7	3.8	9	5.8	4.7

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
20	1	3	4

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	3	0	0	0	0	0	1	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	120	16	120	0	0	0	4	16	0	0	68	200	88	0	0	100	148	24	0	0	904
Heavy Truc	0	0	4			0	0	0			4	24	8			12	16	0			68
Pedestrians		0					20					4					0				24
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
7:00 AM	11	1	10	0	0	0	0	2	0	0	4	31	8	0	0	25	22	1	0	0	115	
7:15 AM	21	2	30	0	0	0	1	0	0	0	13	34	11	0	0	24	32	5	0	0	173	
7:30 AM	35	3	23	0	0	0	2	2	0	0	12	51	24	0	0	24	42	2	0	0	220	
7:45 AM	30	4	30	0	0	0	1	4	0	0	17	50	22	0	0	25	37	6	0	0	226	734
8:00 AM	27	1	24	0	0	2	0	3	0	0	11	26	20	0	0	30	45	4	0	0	193	812
8:15 AM	25	5	17	0	0	0	0	1	0	0	9	37	20	0	0	33	46	4	0	0	197	836
8:30 AM	26	3	30	0	0	1	2	1	0	0	4	56	25	0	0	23	34	2	0	0	207	823
8:45 AM	27	1	18	0	0	3	1	1	0	0	7	33	35	0	0	20	33	4	0	0	183	780

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	1	0	0	0	0	1	0	0	1	0	5	0	8
7:15 AM	0	0	0	0	0	0	1	3	4	5	2	0	15
7:30 AM	1	0	0	0	0	1	0	1	4	3	2	1	13
7:45 AM	0	0	1	0	0	0	1	6	2	3	4	0	17
8:00 AM	0	0	0	0	0	1	0	4	2	1	3	0	11
8:15 AM	1	0	1	0	0	0	1	2	1	2	1	0	9
8:30 AM	0	0	1	0	0	1	0	4	2	2	3	0	13
8:45 AM	2	0	0	0	0	0	1	6	2	0	1	0	12

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
7:00 AM	2	0	0	1	3
7:15 AM	3	0	0	0	3
7:30 AM	11	1	1	1	14
7:45 AM	5	0	0	1	6
8:00 AM	2	0	1	1	4
8:15 AM	2	0	1	1	4
8:30 AM	1	0	3	0	4
8:45 AM	3	1	0	1	5

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	3	0	0	0	0	0	1	0	0	0	0	4
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0

QUALITY COUNTS REPORT
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Intersectio Richmond / Forest Ave
City/State: Buffalo NY
QCJobNo: 13797510
ClientID:
Date: 5/3/2016
Comments:

PEAK HOUI 4:00 PM
PEAK HOUI 5:00 PM
PEAK 15-M 4:00 PM
PEAK 15-M 4:15 PM
PHF 0.95

Lane Configuration:

	SIGNAL	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7		
		LTR								SIGNAL
EBLane7									TR	WBLane1
EBLane6									L	WBLane2
EBLane5										WBLane3
EBLane4										WBLane4
EBLane3										WBLane5
EBLane2	L									WBLane6
EBLane1	TR									WBLane7
SIGNAL								LTR		
		NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	SIGNAL	

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
117	3	96	31	13	36	10	214	174	203	194	7	216	80	398	404	20	390	341	347

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
1.7	0	1	0	0	2.8	20	2.3	2.9	2.5	3.1	0	1.4	1.3	3	2.7	10	2.6	1.8	2.6

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
15	11	12	9

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	1	0	0	1	0	0	1	1	0	0	0

PEAK 15-MIN FLOWRATES

VehicleTyp	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	120	0	100	0	0	56	24	68	0	0	8	212	184	0	0	188	188	8	0	0	1156
Heavy Truc	4	0	0			0	0	0			0	12	8			8	8	0			40
Pedestrians		8					12					4					8				32
Bicycles	0	0	0			0	1	0			0	0	0			0	0	0			1

ALL-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
4:00 PM	30	0	25	0	0	14	6	17	0	0	2	53	46	0	0	47	47	2	0	0	289	
4:15 PM	32	0	27	0	0	4	3	6	0	0	3	45	43	0	0	46	51	2	0	0	262	
4:30 PM	31	1	14	0	0	12	3	11	0	0	4	61	40	0	0	51	43	3	0	0	274	
4:45 PM	24	2	30	0	0	1	1	2	0	0	1	55	45	0	0	59	53	0	0	0	273	1098
5:00 PM	41	0	22	0	0	3	1	7	0	0	1	50	39	0	0	47	53	7	0	0	271	1080
5:15 PM	32	2	15	0	0	1	1	1	0	0	2	43	56	0	0	50	56	5	0	0	264	1082
5:30 PM	30	0	26	0	0	0	2	2	0	0	2	49	54	0	0	46	44	2	0	0	257	1065
5:45 PM	29	1	26	0	0	2	1	2	0	0	3	47	40	0	0	55	59	3	0	0	268	1060

HEAVY-VEHICLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	1	0	0	0	0	0	0	3	2	2	2	0	10
4:15 PM	1	0	0	0	0	0	0	1	0	0	2	0	4
4:30 PM	0	0	1	0	0	1	1	1	2	1	1	0	8
4:45 PM	0	0	0	0	0	0	1	0	1	2	1	0	5
5:00 PM	0	0	0	0	0	0	0	1	1	1	1	0	4
5:15 PM	1	0	0	0	0	0	0	1	0	0	1	0	3
5:30 PM	0	0	0	0	0	0	1	1	0	1	1	0	4
5:45 PM	0	0	1	0	0	1	0	0	0	0	2	0	4

PEDESTRIAN VOLUMES

Time Perio	North	South	East	West	Total
4:00 PM	3	2	2	1	8
4:15 PM	6	2	1	3	12
4:30 PM	1	4	5	2	12
4:45 PM	5	3	4	3	15
5:00 PM	3	1	2	1	7
5:15 PM	5	2	3	8	18
5:30 PM	4	4	3	2	13
5:45 PM	3	1	4	3	11

BICYCLE VOLUMES

Time Perio	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
4:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	1
4:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	1	0	0	0	0	1
5:00 PM	0	0	0	0	1	0	0	0	1	0	1	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	1	0	1	0	0	0	0	0	0	0	2
5:45 PM	1	0	2	0	0	0	0	0	0	0	0	1	4

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

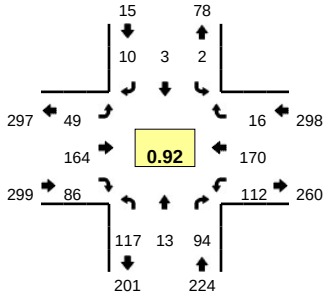
LOCATION: Richmond Ave -- Forest Ave

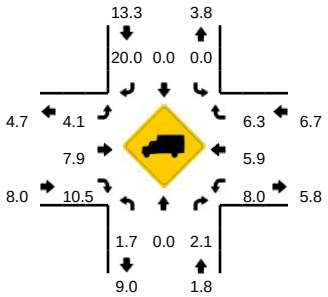
CITY/STATE: Buffalo, NY

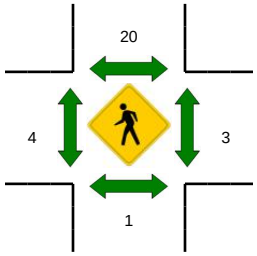
QC JOB #: 13797509

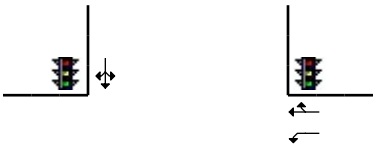
DATE: Tue, May 03 2016

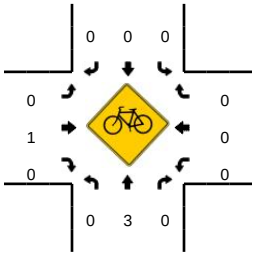
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

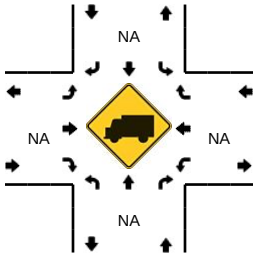


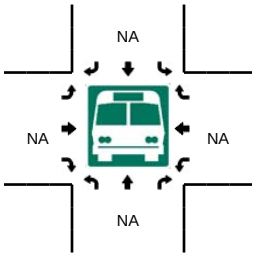












15-Min Count Period Beginning At	Richmond Ave (Northbound)				Richmond Ave (Southbound)				Forest Ave (Eastbound)				Forest Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	11	1	10	0	0	0	2	0	4	31	8	0	25	22	1	0	115	
7:15 AM	21	2	30	0	0	1	0	0	13	34	11	0	24	32	5	0	173	
7:30 AM	35	3	23	0	0	2	2	0	12	51	24	0	24	42	2	0	220	
7:45 AM	30	4	30	0	0	1	4	0	17	50	22	0	25	37	6	0	226	734
8:00 AM	27	1	24	0	2	0	3	0	11	26	20	0	30	45	4	0	193	812
8:15 AM	25	5	17	0	0	0	1	0	9	37	20	0	33	46	4	0	197	836
8:30 AM	26	3	30	0	1	2	1	0	4	56	25	0	23	34	2	0	207	823
8:45 AM	27	1	18	0	3	1	1	0	7	33	35	0	20	33	4	0	183	780

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	120	16	120	0	0	4	16	0	68	200	88	0	100	148	24	0	904
Heavy Trucks	0	0	4		0	0	0		4	24	8		12	16	0		68
Pedestrians		0				20				4				0			24
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

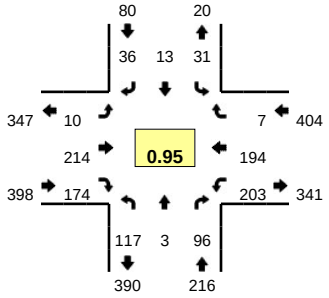
Type of peak hour being reported: Intersection Peak

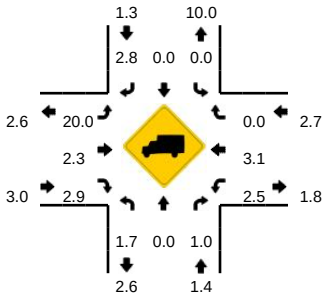
Method for determining peak hour: Total Entering Volume

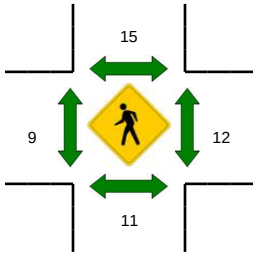
LOCATION: Richmond Ave -- Forest Ave
CITY/STATE: Buffalo, NY

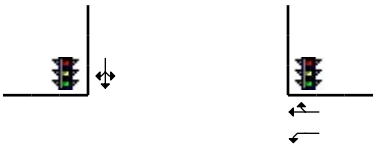
QC JOB #: 13797510
DATE: Tue, May 03 2016

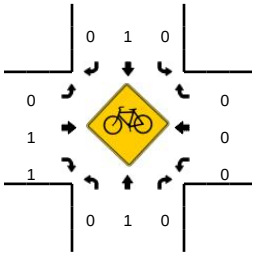
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:00 PM -- 4:15 PM

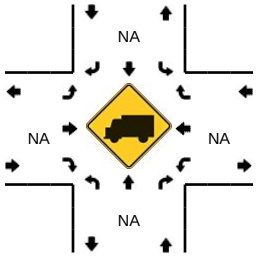


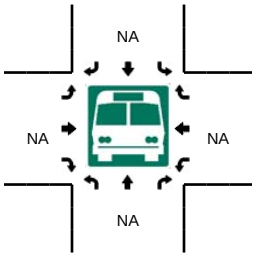












15-Min Count Period Beginning At	Richmond Ave (Northbound)				Richmond Ave (Southbound)				Forest Ave (Eastbound)				Forest Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	30	0	25	0	14	6	17	0	2	53	46	0	47	47	2	0	289	
4:15 PM	32	0	27	0	4	3	6	0	3	45	43	0	46	51	2	0	262	
4:30 PM	31	1	14	0	12	3	11	0	4	61	40	0	51	43	3	0	274	
4:45 PM	24	2	30	0	1	1	2	0	1	55	45	0	59	53	0	0	273	1098
5:00 PM	41	0	22	0	3	1	7	0	1	50	39	0	47	53	7	0	271	1080
5:15 PM	32	2	15	0	1	1	1	0	2	43	56	0	50	56	5	0	264	1082
5:30 PM	30	0	26	0	0	2	2	0	2	49	54	0	46	44	2	0	257	1065
5:45 PM	29	1	26	0	2	1	2	0	3	47	40	0	55	59	3	0	268	1060

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	120	0	100	0	56	24	68	0	8	212	184	0	188	188	8	0	1156
Heavy Trucks	4	0	0		0	0	0		0	12	8		8	8	0		40
Pedestrians		8				12				4				8			32
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 5/11/2016 12:58 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Peak Hour Data for Intersection

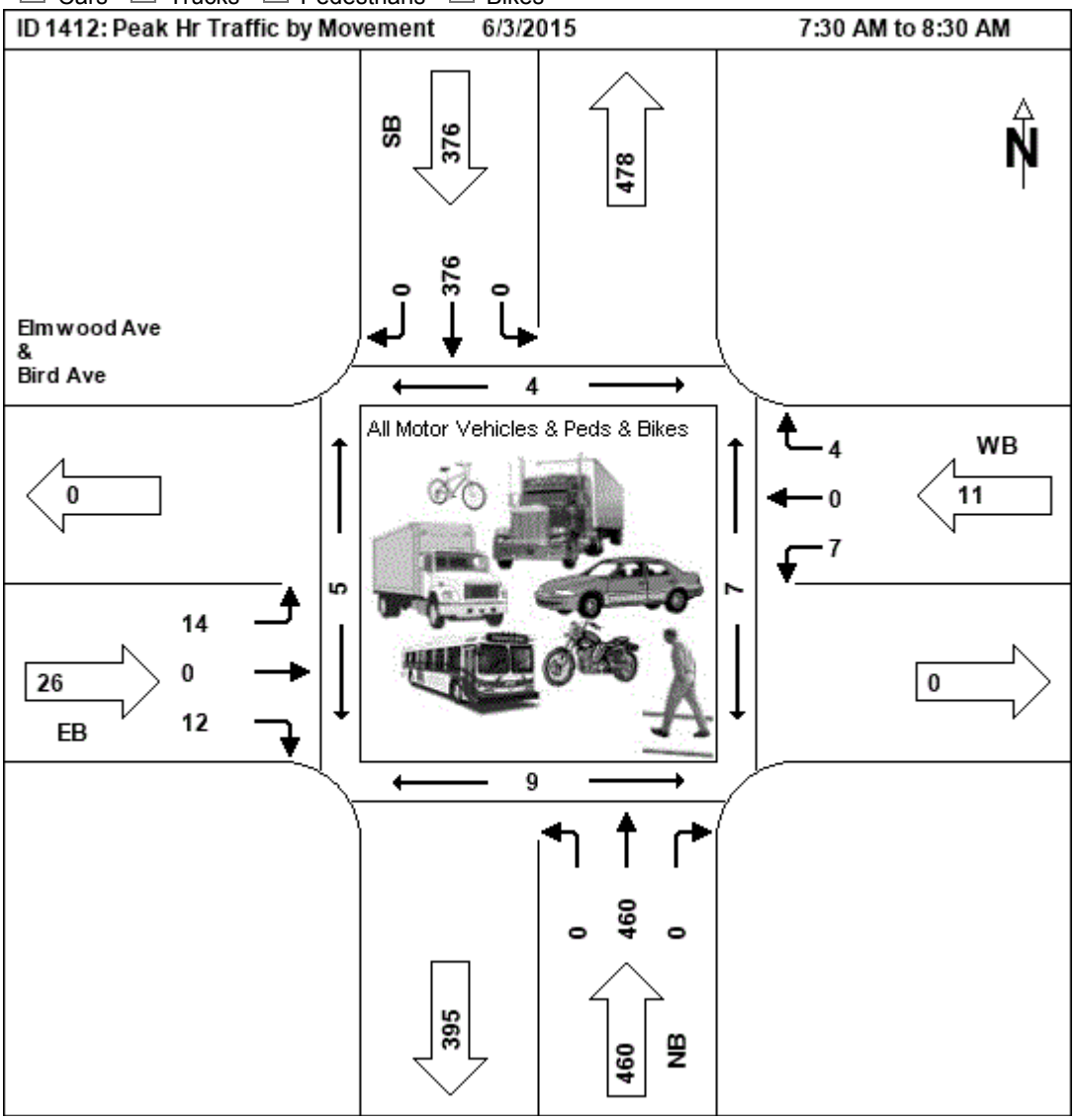
Int ID: 1412
Community: Buffalo
Road 1: Elmwood Ave
Road 2: Bird Ave
Corridor: NA
Road 3:
Road 4:

|<< < > >>| 1-2 of 2

AM Peak Hour
06/03/2015

	NB					EB					SB					WB					
Start Time	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Left	Thru	Right	Ped	App Total	Int Total
7:30 AM	0	120	0	3	120	2	0	4	4	6	0	84	0	1	84	3	0	3	2	6	216
7:45 AM	0	117	0	1	117	1	0	1	2	2	0	95	0	2	95	1	0	0	1	1	215
8:00 AM	0	99	0	2	99	9	0	5	2	14	0	108	0	2	108	2	0	1	1	3	224
8:15 AM	0	123	0	1	123	1	0	2	1	3	0	83	0	0	83	1	0	0	0	1	210
Total	0	459	0	7	459	13	0	12	9	25	0	370	0	5	370	7	0	4	4	11	865
PHF		0.93			0.93	0.36		0.60		0.45		0.86			0.86	0.58		0.33		0.46	
HV %		9				0		0				5				14		0			

☑ Cars ☑ Trucks ☑ Pedestrians ☑ Bikes

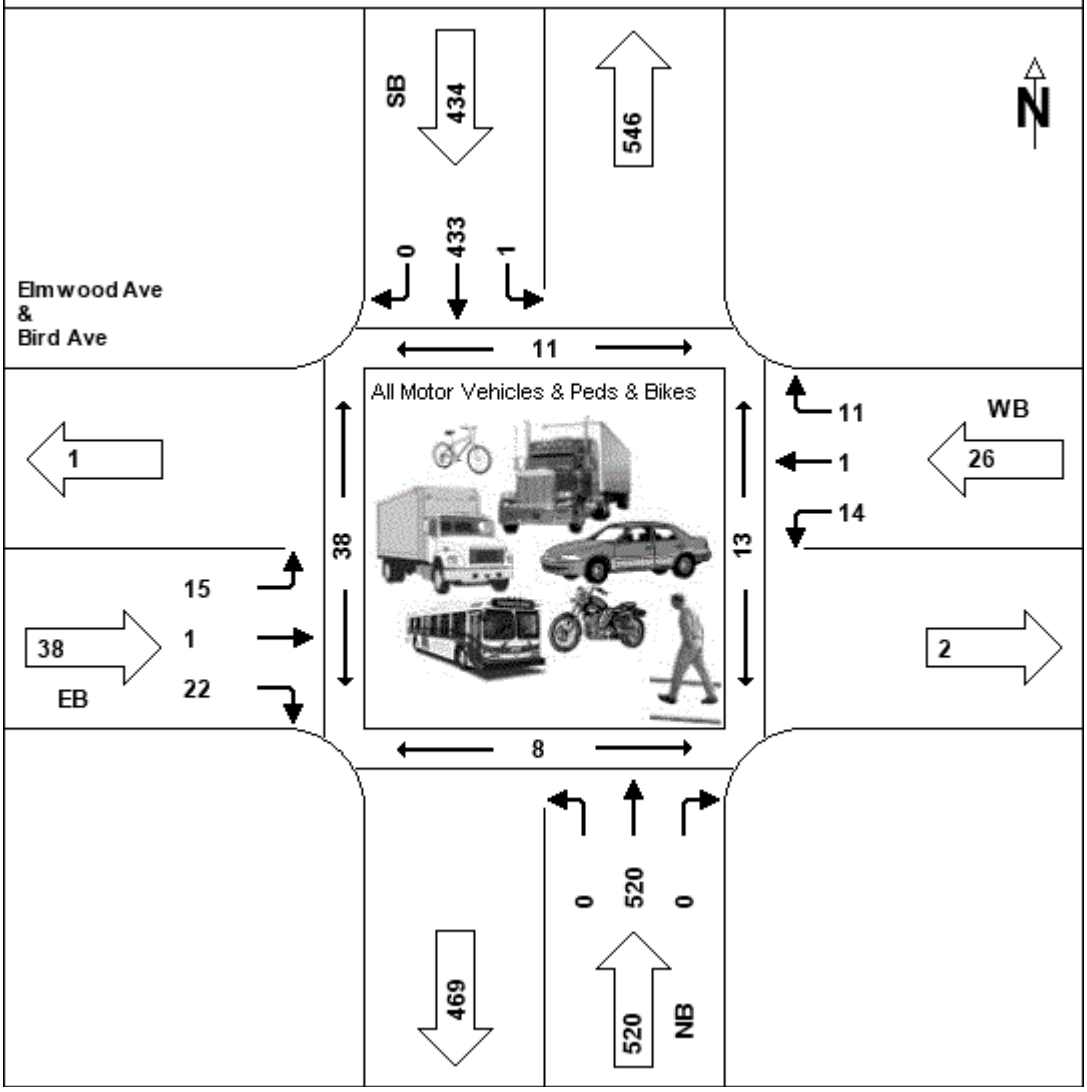


Midday Peak Hour
06/03/2015

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
1:00 PM	0	139	0	2	139	6	0	8	3	14	0	90	0	7	90	4	0	2	8	6	249
1:15 PM	0	133	0	7	133	2	0	6	1	8	0	99	0	11	99	2	1	4	1	7	247
1:30 PM	0	127	0	4	127	4	0	4	3	8	0	107	0	11	107	3	0	4	2	7	249
1:45 PM	0	114	0	0	114	3	0	3	1	6	1	122	0	9	123	3	0	1	0	4	247
Total	0	513	0	13	513	15	0	21	8	36	1	418	0	38	419	12	1	11	11	24	992
PHF		0.92			0.92	0.63		0.66		0.64	0.25	0.86			0.85	0.75	0.25	0.69		0.86	
HV %		6				13		5			0	7				0	100	9			

☑ Cars ☑ Trucks ☑ Pedestrians ☑ Bikes

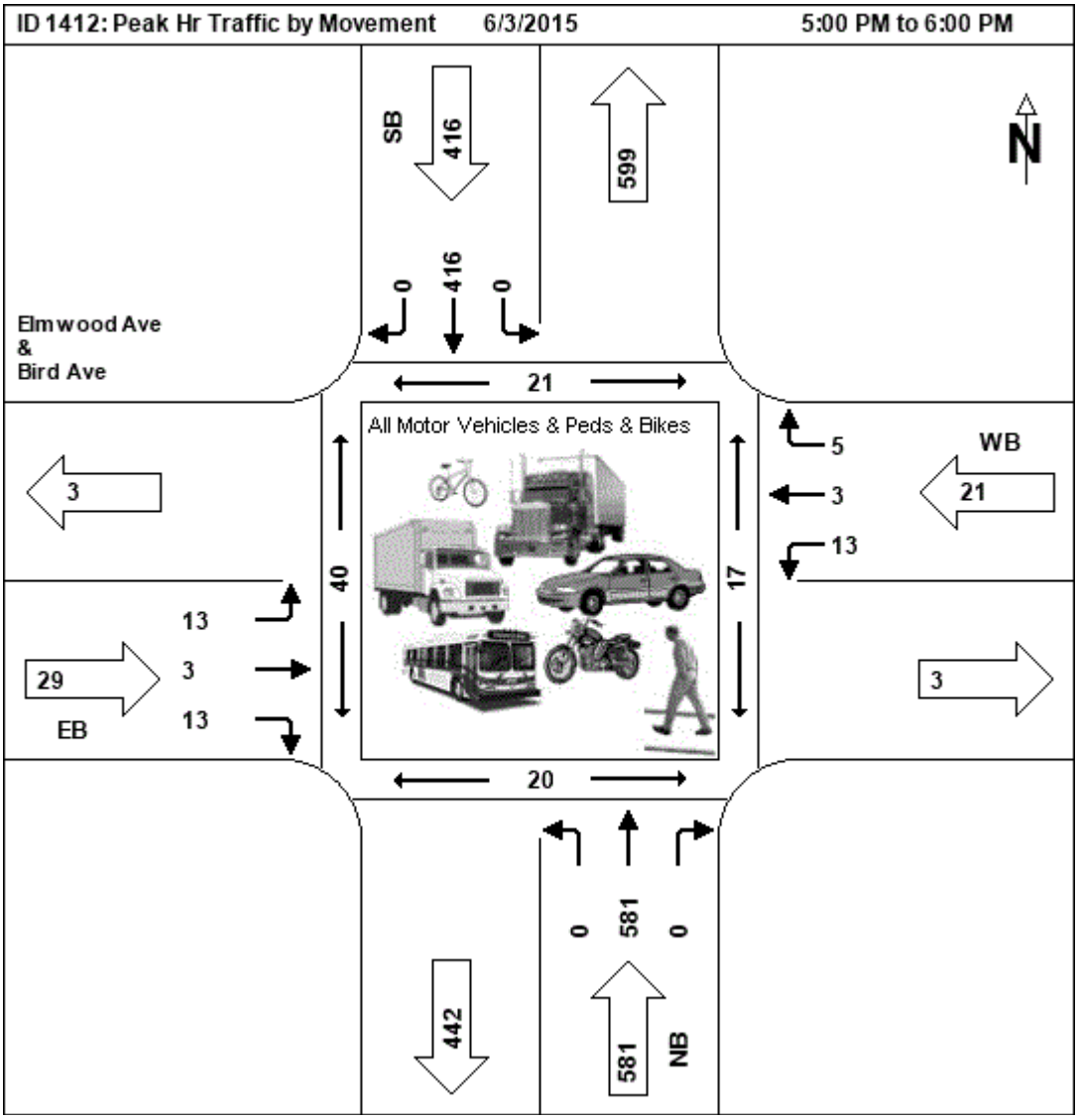
ID 1412: Peak Hr Traffic by Movement 6/3/2015 1:00 PM to 2:00 PM



PM Peak Hour
06/03/2015

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
5:00 PM	0	141	0	1	141	6	0	2	2	8	0	109	0	7	109	3	0	0	5	3	261
5:15 PM	0	138	0	0	138	2	0	2	4	4	0	102	0	13	102	3	1	2	2	6	250
5:30 PM	0	156	0	10	156	0	0	5	4	5	0	90	0	9	90	2	0	2	3	4	255
5:45 PM	0	133	0	6	133	4	0	4	10	8	0	104	0	11	104	5	2	1	11	8	253
Total	0	568	0	17	568	12	0	13	20	25	0	405	0	40	405	13	3	5	21	21	1019
PHF		0.91			0.91	0.50		0.65		0.78		0.93			0.93	0.65	0.38	0.63		0.66	
HV %		4				0		0				5				8	100	0			

☑ Cars ☑ Trucks ☑ Pedestrians ☑ Bikes



Peak Hour Data for Intersection

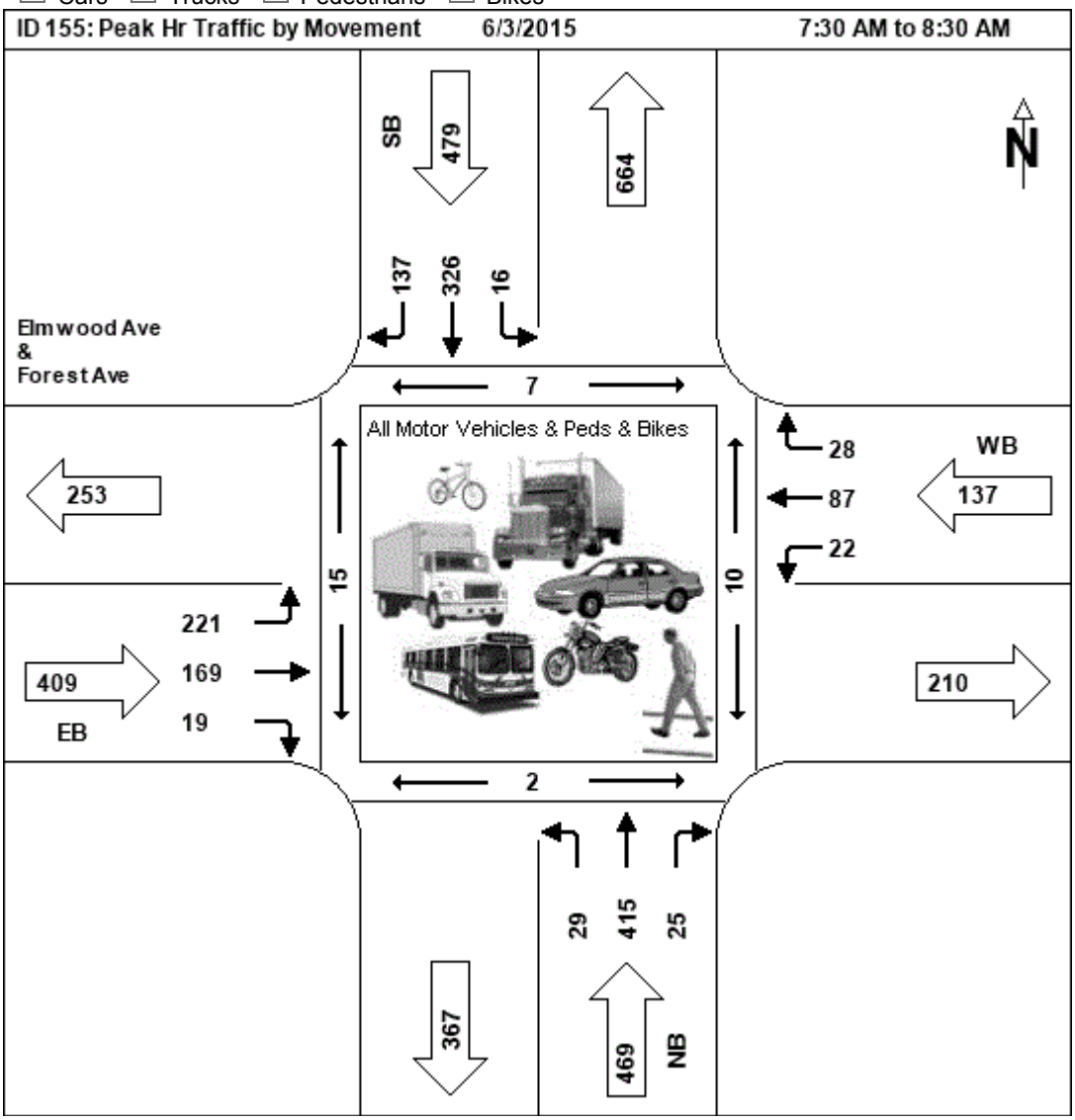
Int ID: 155
Community: Buffalo
Road 1: Elmwood Ave
Road 2: Forest Ave
Corridor: NA
Road 3:
Road 4:

|<< < > >>| 1-3 of 3

AM Peak Hour
06/03/2015

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
7:30 AM	11	111	4	2	126	58	44	2	0	104	4	81	21	4	106	6	20	5	3	31	367
7:45 AM	7	108	5	0	120	62	50	2	0	114	6	83	37	5	126	5	28	7	3	40	400
8:00 AM	4	88	11	6	103	54	44	8	2	106	2	90	37	2	129	5	14	10	0	29	367
8:15 AM	7	104	5	2	116	47	28	7	0	82	4	72	42	4	118	5	25	6	1	36	352
Total	29	411	25	10	465	221	166	19	2	406	16	326	137	15	479	21	87	28	7	136	1486
PHF	0.66	0.93	0.57		0.92	0.89	0.83	0.59		0.89	0.67	0.91	0.82		0.93	0.88	0.78	0.70		0.85	
HV %	7	3	0			1	2	5			6	6	4			0	9	4			

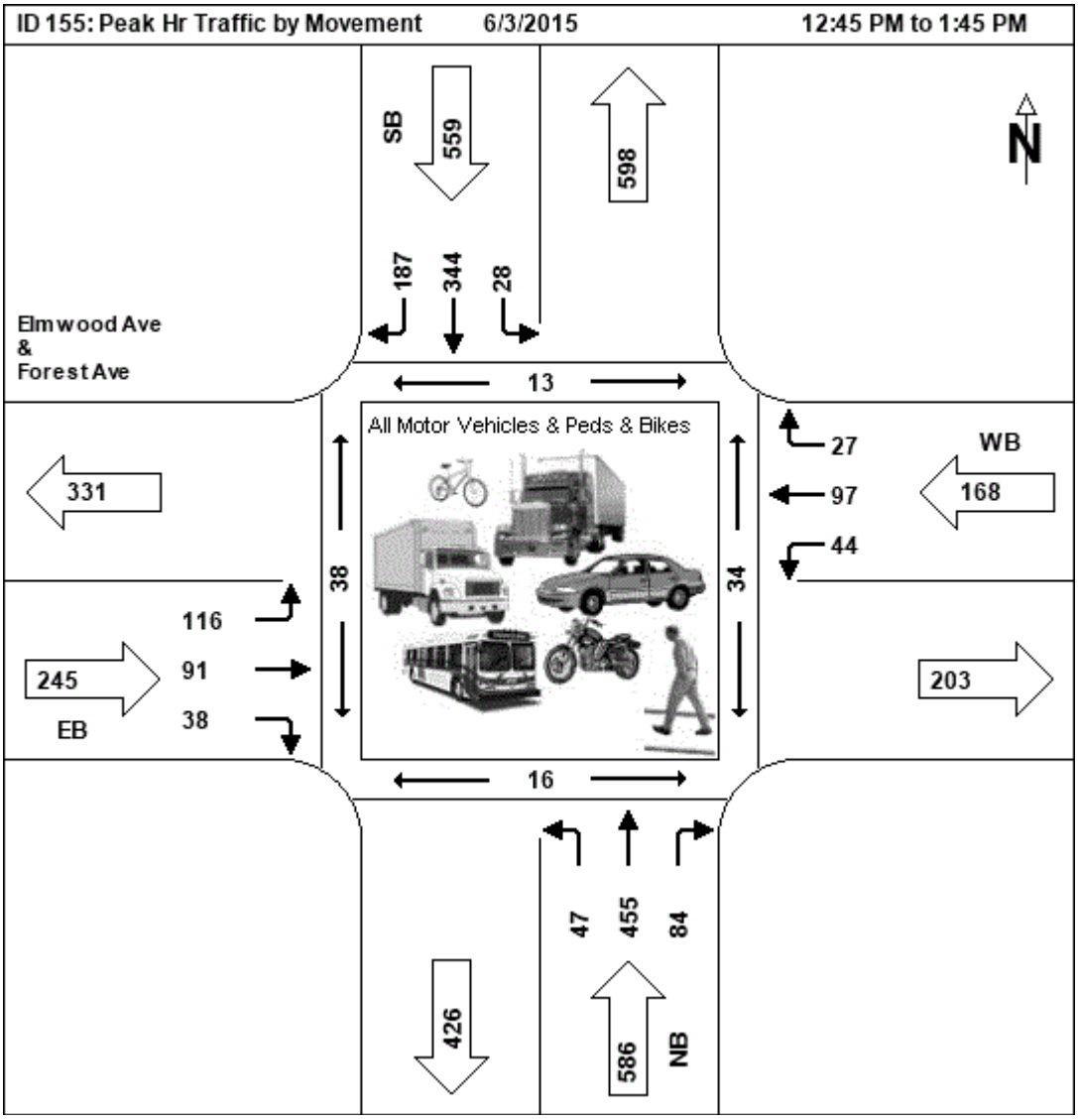
☑ Cars ☑ Trucks ☑ Pedestrians ☑ Bikes



Midday Peak Hour
06/03/2015

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
12:45 PM	5	118	19	4	142	37	24	13	2	74	11	68	53	12	132	12	26	9	10	47	395
1:00 PM	18	107	24	13	149	21	24	5	2	50	8	88	40	11	136	17	26	4	0	47	382
1:15 PM	7	113	19	5	139	29	23	8	5	60	4	82	49	8	135	11	22	8	2	41	375
1:30 PM	17	109	19	12	145	28	20	12	7	60	5	101	44	7	150	4	23	5	1	32	387
Total	47	447	81	34	575	115	91	38	16	244	28	339	186	38	553	44	97	26	13	167	1539
PHF	0.65	0.95	0.84		0.96	0.78	0.95	0.73		0.82	0.64	0.84	0.88		0.92	0.65	0.93	0.72		0.89	
HV %	0	4	1			1	1	5			4	6	3			5	3	0			

☑ Cars ☑ Trucks ☑ Pedestrians ☑ Bikes

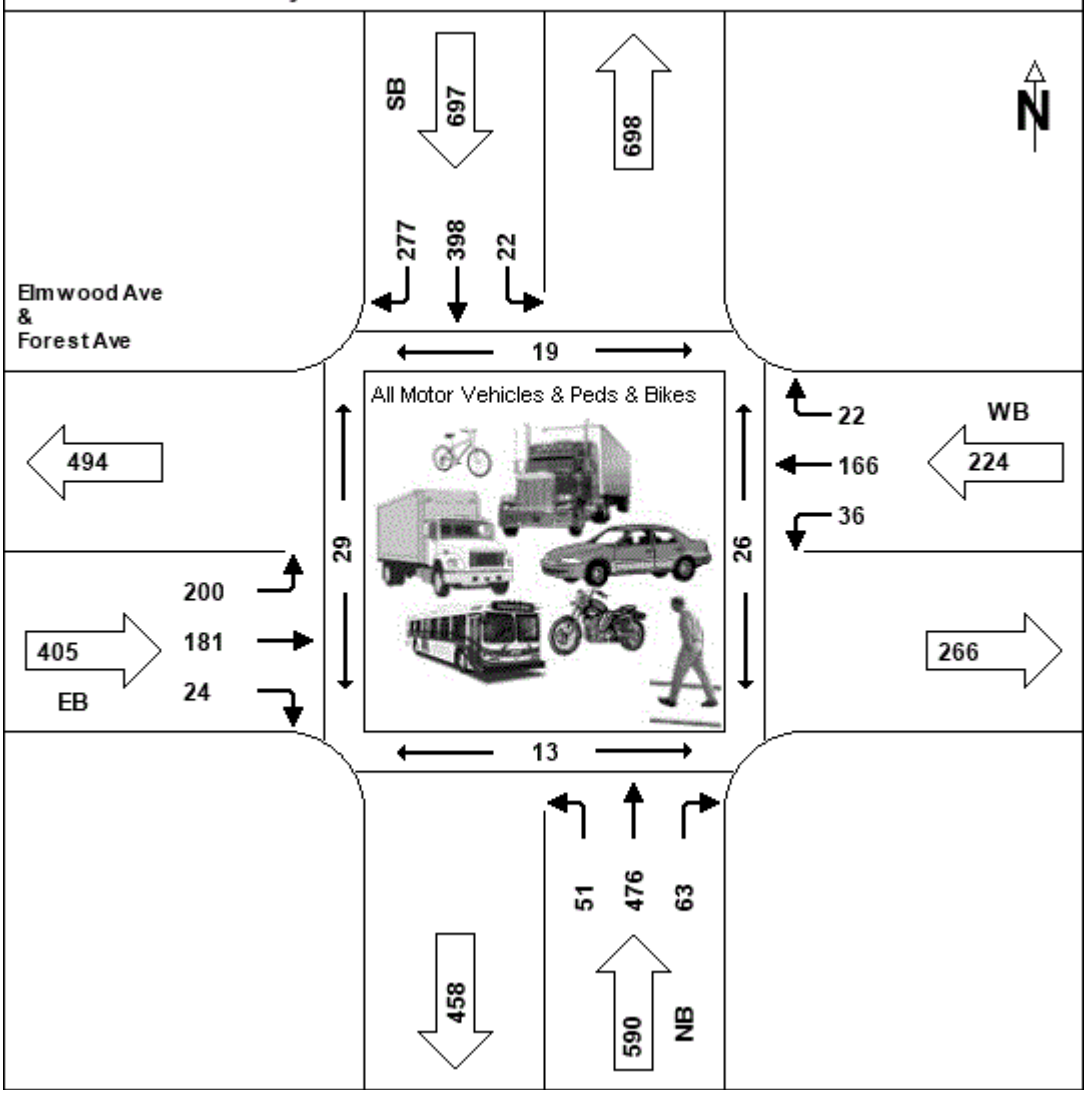


PM Peak Hour
06/03/2015

Start Time	NB Left	NB Thru	NB Right	NB Ped	NB App Total	EB Left	EB Thru	EB Right	EB Ped	EB App Total	SB Left	SB Thru	SB Right	SB Ped	SB App Total	WB Left	WB Thru	WB Right	WB Ped	WB App Total	Int Total
5:00 PM	12	117	15	9	144	47	32	4	5	83	7	97	61	3	165	10	33	3	2	46	438
5:15 PM	15	114	11	4	140	52	52	9	1	113	5	98	73	8	176	9	48	5	7	62	491
5:30 PM	12	137	15	4	164	45	48	5	4	98	5	91	68	3	164	6	39	8	4	53	479
5:45 PM	10	96	17	9	123	56	43	6	3	105	5	107	75	15	187	11	40	6	6	57	472
Total	49	464	58	26	571	200	175	24	13	399	22	393	277	29	692	36	160	22	19	218	1880
PHF	0.82	0.85	0.85		0.87	0.89	0.84	0.67		0.88	0.79	0.92	0.92		0.93	0.82	0.83	0.69		0.88	
HV %	0	2	2			0	3	0			14	4	2			0	4	0			

☑ Cars ☑ Trucks ☑ Pedestrians ☑ Bikes

ID 155: Peak Hr Traffic by Movement 6/3/2015 5:00 PM to 6:00 PM



Appendix B:

Capacity Analysis Reports - Synchro Outputs

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	7	0	367	253
Future Volume (vph)	11	0	7	0	367	253
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	60.0	60.0
Total Split (%)	29.4%	29.4%	29.4%	29.4%	70.6%	70.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	55.0	55.0
Actuated g/C Ratio		0.24		0.24	0.65	0.65
v/c Ratio		0.13		0.06	0.35	0.25
Control Delay		16.1		9.8	7.9	4.7
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		16.1		9.8	7.9	4.7
LOS		B		A	A	A
Approach Delay		16.1		9.8	7.9	4.7
Approach LOS		B		A	A	A

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 13 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 43.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	22	395	294
v/c Ratio	0.13	0.06	0.35	0.25
Control Delay	16.1	9.8	7.9	4.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.1	9.8	7.9	4.7
Queue Length 50th (ft)	10	0	85	41
Queue Length 95th (ft)	13	3	133	m57
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	379	346	1127	1171
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.06	0.35	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	3	5	375	6	10	250
Future Vol, veh/h	3	5	375	6	10	250
Conflicting Peds, #/hr	1	6	0	31	31	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	89	89	75	75
Heavy Vehicles, %	0	20	9	0	0	7
Mvmt Flow	4	7	421	7	13	333

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	817	462	0	0	459	0
Stage 1	456	-	-	-	-	-
Stage 2	361	-	-	-	-	-
Critical Hdwy	6.4	6.4	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.48	-	-	2.2	-
Pot Cap-1 Maneuver	349	564	-	-	1113	-
Stage 1	643	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	334	544	-	-	1107	-
Mov Cap-2 Maneuver	334	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	699	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.4	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	440	1107	-
HCM Lane V/C Ratio	-	-	0.027	0.012	-
HCM Control Delay (s)	-	-	13.4	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	34	10	0	69	353	3	262
Future Volume (vph)	34	10	0	69	353	3	262
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA
Protected Phases		4	8	5	2		6
Permitted Phases	4			2		6	
Detector Phase	4	4	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	25.0	25.0	25.0	12.0	60.0	48.0	48.0
Total Split (%)	29.4%	29.4%	29.4%	14.1%	70.6%	56.5%	56.5%
Yellow Time (s)	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?				Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	20.0	20.0	20.0		55.0		43.0
Actuated g/C Ratio	0.24	0.24	0.24		0.65		0.51
v/c Ratio	0.18	0.15	0.01		0.24		0.29
Control Delay	28.0	12.3	0.0		8.5		8.1
Queue Delay	0.0	0.0	0.0		0.0		0.0
Total Delay	28.0	12.3	0.0		8.5		8.1
LOS	C	B	A		A		A
Approach Delay		19.6			8.5		8.1
Approach LOS		B			A		A

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 70 (82%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.29	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	60	4	441	467
v/c Ratio	0.18	0.15	0.01	0.24	0.29
Control Delay	28.0	12.3	0.0	8.5	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	12.3	0.0	8.5	8.1
Queue Length 50th (ft)	22	6	0	63	44
Queue Length 95th (ft)	38	22	0	m73	68
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	282	397	736	1841	1631
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.15	0.01	0.24	0.29

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	49	164	112	170	117	13	2	3
Future Volume (vph)	49	164	112	170	117	13	2	3
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	25.0		15.0		15.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.30		0.30
v/c Ratio	0.11	0.35	0.28	0.26		0.54		0.05
Control Delay	7.3	6.9	9.1	7.7		15.3		9.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.3	6.9	9.1	7.7		15.3		9.0
LOS	A	A	A	A		B		A
Approach Delay		7.0		8.2		15.3		9.0
Approach LOS		A		A		B		A

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 52.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave

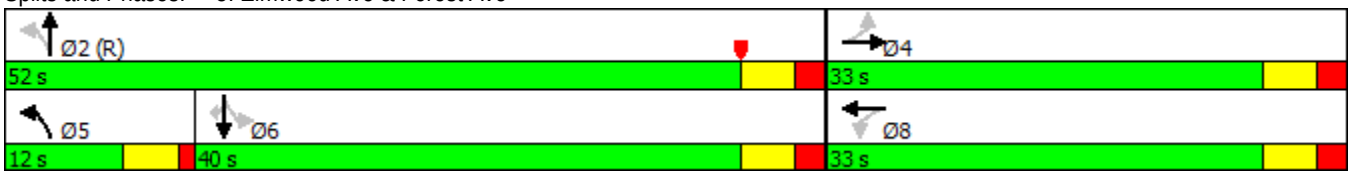
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	58	297	140	233	260	20
v/c Ratio	0.11	0.35	0.28	0.26	0.54	0.05
Control Delay	7.3	6.9	9.1	7.7	15.3	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.3	6.9	9.1	7.7	15.3	9.0
Queue Length 50th (ft)	8	34	22	33	43	1
Queue Length 95th (ft)	21	65	42	56	93	10
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	552	857	509	888	480	439
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.35	0.28	0.26	0.54	0.05

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	141	194	37	147	23	332	12	200	105
Future Volume (vph)	141	194	37	147	23	332	12	200	105
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	33.0	33.0	33.0	33.0	12.0	52.0	40.0	40.0	40.0
Total Split (%)	38.8%	38.8%	38.8%	38.8%	14.1%	61.2%	47.1%	47.1%	47.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		27.5		27.5		46.5		34.5	34.5
Actuated g/C Ratio		0.32		0.32		0.55		0.41	0.41
v/c Ratio		0.94		0.54		0.43		0.32	0.17
Control Delay		62.0		26.9		10.6		14.1	2.0
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		62.0		26.9		10.6		14.1	2.0
LOS		E		C		B		B	A
Approach Delay		62.0		26.9		10.6		10.1	
Approach LOS		E		C		B		B	

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Pretimed	
Maximum v/c Ratio: 0.94	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 87.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	392	270	420	228	113
v/c Ratio	0.94	0.54	0.43	0.32	0.17
Control Delay	62.0	26.9	10.6	14.1	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	26.9	10.6	14.1	2.0
Queue Length 50th (ft)	200	110	87	52	0
Queue Length 95th (ft)	#373	173	124	80	7
Internal Link Dist (ft)	78	128	326	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	416	502	978	705	666
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.94	0.54	0.43	0.32	0.17

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	250	0	0	218	4	8	0	26	12	0	5
Future Vol, veh/h	3	250	0	0	218	4	8	0	26	12	0	5
Conflicting Peds, #/hr	5	0	12	12	0	5	3	0	5	5	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	94	94	94	77	77	77	53	53	53
Heavy Vehicles, %	0	6	0	0	4	0	25	0	4	0	0	0
Mvmt Flow	4	316	0	0	232	4	10	0	34	23	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	241	0	-	-	-	0	561	565	321	585	-	242
Stage 1	-	-	-	-	-	-	324	324	-	239	-	-
Stage 2	-	-	-	-	-	-	237	241	-	346	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.35	6.5	6.24	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.725	4	3.336	3.5	-	3.3
Pot Cap-1 Maneuver	1337	-	0	0	-	-	405	437	715	425	0	802
Stage 1	-	-	0	0	-	-	642	653	-	769	0	-
Stage 2	-	-	0	0	-	-	717	710	-	674	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1333	-	-	-	-	-	398	433	712	400	-	796
Mov Cap-2 Maneuver	-	-	-	-	-	-	398	433	-	400	-	-
Stage 1	-	-	-	-	-	-	639	650	-	762	-	-
Stage 2	-	-	-	-	-	-	706	707	-	636	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	11.5	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	601	1333	-	-	-	400	796
HCM Lane V/C Ratio	0.073	0.003	-	-	-	0.057	0.012
HCM Control Delay (s)	11.5	7.7	0	-	-	14.5	9.6
HCM Lane LOS	B	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	0	-	-	-	0.2	0

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	257	22	0	20	213	4	0	0	0	0
Future Vol, veh/h	0	11	257	22	0	20	213	4	0	0	0	0
Peak Hour Factor	0.92	0.83	0.83	0.83	0.92	0.96	0.96	0.96	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	0	5	18	2	0	4	0	2	0	0	0
Mvmt Flow	0	13	310	27	0	21	222	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10	9.2	0
HCM LOS	A	A	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	8%	23%
Vol Thru, %	100%	89%	90%	55%
Vol Right, %	0%	8%	2%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	290	237	22
LT Vol	0	11	20	5
Through Vol	0	257	213	12
RT Vol	0	22	4	5
Lane Flow Rate	0	349	247	36
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.399	0.298	0.051
Departure Headway (Hd)	5.23	4.217	4.342	5.075
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	860	832	708
Service Time	3.248	2.217	2.348	3.088
HCM Lane V/C Ratio	0	0.406	0.297	0.051
HCM Control Delay	8.2	10	9.2	8.4
HCM Lane LOS	N	A	A	A
HCM 95th-tile Q	0	1.9	1.3	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	5	12	5
Future Vol, veh/h	0	5	12	5
Peak Hour Factor	0.92	0.61	0.61	0.61
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	8	20	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.4
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	56	193	13	0	77	194	10	0	36	165	1	0	8	129	7
Future Vol, veh/h	0	56	193	13	0	77	194	10	0	36	165	1	0	8	129	7
Peak Hour Factor	0.92	0.83	0.83	0.83	0.92	0.96	0.96	0.96	0.92	0.84	0.84	0.84	0.92	0.67	0.67	0.67
Heavy Vehicles, %	2	4	6	0	2	4	3	0	2	6	6	0	2	0	1	0
Mvmt Flow	0	67	233	16	0	80	202	10	0	43	196	1	0	12	193	10
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.9	15.2	14.2	13.2
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	21%	27%	6%
Vol Thru, %	82%	74%	69%	90%
Vol Right, %	0%	5%	4%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	202	262	281	144
LT Vol	36	56	77	8
Through Vol	165	193	194	129
RT Vol	1	13	10	7
Lane Flow Rate	240	316	293	215
Geometry Grp	1	1	1	1
Degree of Util (X)	0.428	0.533	0.499	0.378
Departure Headway (Hd)	6.41	6.076	6.14	6.329
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	560	593	585	567
Service Time	4.458	4.119	4.186	4.379
HCM Lane V/C Ratio	0.429	0.533	0.501	0.379
HCM Control Delay	14.2	15.9	15.2	13.2
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	2.1	3.1	2.8	1.8

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Traffic Vol, veh/h	0	199	3	0	23	276	0	5	166
Future Vol, veh/h	0	199	3	0	23	276	0	5	166
Peak Hour Factor	0.92	0.83	0.83	0.92	0.96	0.96	0.92	0.84	0.84
Heavy Vehicles, %	2	6	0	2	0	3	2	0	4
Mvmt Flow	0	240	4	0	24	288	0	6	198
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.2	10.9	9.3
HCM LOS	B	B	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	3%	0%	8%
Vol Thru, %	0%	99%	92%
Vol Right, %	97%	1%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	171	202	299
LT Vol	5	0	23
Through Vol	0	199	276
RT Vol	166	3	0
Lane Flow Rate	204	243	311
Geometry Grp	1	1	1
Degree of Util (X)	0.26	0.326	0.405
Departure Headway (Hd)	4.598	4.829	4.68
Convergence, Y/N	Yes	Yes	Yes
Cap	776	740	766
Service Time	2.654	2.889	2.736
HCM Lane V/C Ratio	0.263	0.328	0.406
HCM Control Delay	9.3	10.2	10.9
HCM Lane LOS	A	B	B
HCM 95th-tile Q	1	1.4	2

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	13	0	487	357
Future Volume (vph)	11	0	13	0	487	357
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	75.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	70.0	70.0
Actuated g/C Ratio		0.20		0.20	0.70	0.70
v/c Ratio		0.10		0.09	0.42	0.30
Control Delay		18.0		16.0	7.6	3.3
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		18.0		16.0	7.6	3.3
LOS		B		B	A	A
Approach Delay		18.0		16.0	7.6	3.3
Approach LOS		B		B	A	A

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 13 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.42	
Intersection Signal Delay: 6.4	Intersection LOS: A
Intersection Capacity Utilization 49.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	31	26	535	384
v/c Ratio	0.10	0.09	0.42	0.30
Control Delay	18.0	16.0	7.6	3.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.0	16.0	7.6	3.3
Queue Length 50th (ft)	5	2	126	42
Queue Length 95th (ft)	24	15	184	m51
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	314	289	1278	1267
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	0.09	0.42	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	3	12	482	19	15	354
Future Vol, veh/h	3	12	482	19	15	354
Conflicting Peds, #/hr	6	8	0	67	67	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	85	85	93	93
Heavy Vehicles, %	0	0	2	0	0	1
Mvmt Flow	4	16	567	22	16	381

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1064	653	0	0	656	0
Stage 1	645	-	-	-	-	-
Stage 2	419	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	249	471	-	-	941	-
Stage 1	526	-	-	-	-	-
Stage 2	668	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	227	438	-	-	934	-
Mov Cap-2 Maneuver	227	-	-	-	-	-
Stage 1	492	-	-	-	-	-
Stage 2	650	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	15.3	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	369	934	-
HCM Lane V/C Ratio	-	-	0.054	0.017	-
HCM Control Delay (s)	-	-	15.3	8.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	84	14	4	0	92	358	10	386
Future Volume (vph)	84	14	4	0	92	358	10	386
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	30.0	30.0	30.0	30.0	14.0	70.0	56.0	56.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	14.0%	70.0%	56.0%	56.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0		5.0		5.0		5.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		65.0		51.0
Actuated g/C Ratio	0.25	0.25		0.25		0.65		0.51
v/c Ratio	0.33	0.26		0.03		0.27		0.34
Control Delay	34.2	9.7		28.8		9.5		13.7
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	34.2	9.7		28.8		9.5		13.7
LOS	C	A		C		A		B
Approach Delay		20.8		28.8		9.5		13.7
Approach LOS		C		C		A		B

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 70 (70%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.34	
Intersection Signal Delay: 13.4	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	101	122	8	483	545
v/c Ratio	0.33	0.26	0.03	0.27	0.34
Control Delay	34.2	9.7	28.8	9.5	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	9.7	28.8	9.5	13.7
Queue Length 50th (ft)	53	8	4	94	92
Queue Length 95th (ft)	92	44	9	m106	129
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	310	463	302	1760	1614
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.33	0.26	0.03	0.27	0.34

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	8	189	198	212	132	3	6	5
Future Volume (vph)	8	189	198	212	132	3	6	5
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	25.0		15.0		15.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.30		0.30
v/c Ratio	0.02	0.44	0.49	0.27		0.55		0.10
Control Delay	6.5	6.8	17.9	12.1		15.9		9.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.5	6.8	17.9	12.1		15.9		9.0
LOS	A	A	B	B		B		A
Approach Delay		6.8		14.8		15.9		9.0
Approach LOS		A		B		B		A

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave

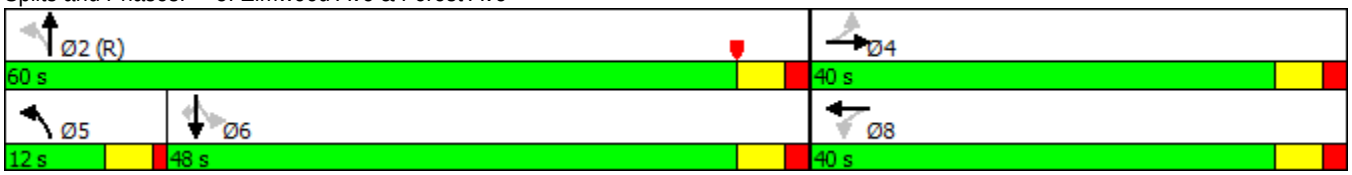
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	9	410	218	252	251	45
v/c Ratio	0.02	0.44	0.49	0.27	0.55	0.10
Control Delay	6.5	6.8	17.9	12.1	15.9	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.5	6.8	17.9	12.1	15.9	9.0
Queue Length 50th (ft)	1	42	74	76	43	5
Queue Length 95th (ft)	6	91	126	121	98	10
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	501	925	442	926	458	463
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.44	0.49	0.27	0.55	0.10

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	120	216	41	191	43	400	30	299	182
Future Volume (vph)	120	216	41	191	43	400	30	299	182
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	40.0	40.0	40.0	40.0	12.0	60.0	48.0	48.0	48.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	12.0%	60.0%	48.0%	48.0%	48.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		34.5		34.5		54.5		42.5	42.5
Actuated g/C Ratio		0.34		0.34		0.54		0.42	0.42
v/c Ratio		0.90		0.53		0.64		0.50	0.27
Control Delay		53.8		30.0		14.4		16.2	2.4
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		53.8		30.0		14.4		16.2	2.4
LOS		D		C		B		B	A
Approach Delay		53.8		30.0		14.4		11.3	
Approach LOS		D		C		B		B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Pretimed	
Maximum v/c Ratio: 0.90	
Intersection Signal Delay: 24.5	Intersection LOS: C
Intersection Capacity Utilization 96.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	400	294	606	354	196
v/c Ratio	0.90	0.53	0.64	0.50	0.27
Control Delay	53.8	30.0	14.4	16.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	30.0	14.4	16.2	2.4
Queue Length 50th (ft)	218	146	131	167	0
Queue Length 95th (ft)	#408	223	165	259	0
Internal Link Dist (ft)	78	128	326	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	445	551	940	703	726
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.90	0.53	0.64	0.50	0.27

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	350	0	0	253	260	6	1	14	5	0	8
Future Vol, veh/h	7	350	0	0	253	260	6	1	14	5	0	8
Conflicting Peds, #/hr	10	0	26	26	0	10	7	0	4	4	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	88	88	88	66	66	66	46	46	46
Heavy Vehicles, %	0	1	0	0	2	0	0	0	7	0	0	0
Mvmt Flow	8	412	0	0	288	295	9	2	21	11	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	593	0	-	-	-	0	870	1021	416	889	-	452
Stage 1	-	-	-	-	-	-	428	428	-	445	-	-
Stage 2	-	-	-	-	-	-	442	593	-	444	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.1	6.5	6.27	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.5	4	3.363	3.5	-	3.3
Pot Cap-1 Maneuver	993	-	0	0	-	-	274	238	626	266	0	612
Stage 1	-	-	0	0	-	-	609	588	-	596	0	-
Stage 2	-	-	0	0	-	-	598	497	-	597	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	986	-	-	-	-	-	262	233	624	250	-	602
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	233	-	250	-	-
Stage 1	-	-	-	-	-	-	602	582	-	584	-	-
Stage 2	-	-	-	-	-	-	577	492	-	567	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	14.2	14.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	423	986	-	-	-	250	602
HCM Lane V/C Ratio	0.075	0.008	-	-	-	0.043	0.029
HCM Control Delay (s)	14.2	8.7	0	-	-	20.1	11.2
HCM Lane LOS	B	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.2	0	-	-	-	0.1	0.1

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	5	332	28	0	9	248	4	0	0	0	0
Future Vol, veh/h	0	5	332	28	0	9	248	4	0	0	0	0
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	0	2	0	2	0	0	0	2	0	2	0
Mvmt Flow	0	5	365	31	0	10	279	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	11.2	10	0
HCM LOS	B	A	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	1%	3%	10%
Vol Thru, %	100%	91%	95%	62%
Vol Right, %	0%	8%	2%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	365	261	48
LT Vol	0	5	9	5
Through Vol	0	332	248	30
RT Vol	0	28	4	13
Lane Flow Rate	0	401	293	52
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.479	0.362	0.076
Departure Headway (Hd)	5.515	4.298	4.439	5.237
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	838	812	682
Service Time	3.567	2.319	2.462	3.28
HCM Lane V/C Ratio	0	0.479	0.361	0.076
HCM Control Delay	8.6	11.2	10	8.7
HCM Lane LOS	N	B	A	A
HCM 95th-tile Q	0	2.6	1.7	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	5	30	13
Future Vol, veh/h	0	5	30	13
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	0	0	0
Mvmt Flow	0	5	33	14
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.7
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	16.5
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	32	293	12	0	82	219	18	0	35	162	3	0	22	109	7
Future Vol, veh/h	0	32	293	12	0	82	219	18	0	35	162	3	0	22	109	7
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.86	0.86	0.86	0.92	0.82	0.82	0.82
Heavy Vehicles, %	2	0	3	0	2	2	2	0	2	3	1	0	2	0	1	0
Mvmt Flow	0	35	322	13	0	92	246	20	0	41	188	3	0	27	133	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.2	17.9	14.5	12.8
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	9%	26%	16%
Vol Thru, %	81%	87%	69%	79%
Vol Right, %	1%	4%	6%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	200	337	319	138
LT Vol	35	32	82	22
Through Vol	162	293	219	109
RT Vol	3	12	18	7
Lane Flow Rate	233	370	358	168
Geometry Grp	1	1	1	1
Degree of Util (X)	0.426	0.615	0.602	0.313
Departure Headway (Hd)	6.594	5.98	6.05	6.703
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	544	604	595	535
Service Time	4.647	4.026	4.098	4.763
HCM Lane V/C Ratio	0.428	0.613	0.602	0.314
HCM Control Delay	14.5	18.2	17.9	12.8
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	2.1	4.2	4	1.3

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Traffic Vol, veh/h	0	318	0	0	15	303	0	16	210
Future Vol, veh/h	0	318	0	0	15	303	0	16	210
Peak Hour Factor	0.92	0.91	0.91	0.92	0.89	0.89	0.92	0.96	0.96
Heavy Vehicles, %	2	3	0	2	0	2	2	0	1
Mvmt Flow	0	349	0	0	17	340	0	17	219
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.7	12.8	10.6
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	5%
Vol Thru, %	0%	100%	95%
Vol Right, %	93%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	226	318	318
LT Vol	16	0	15
Through Vol	0	318	303
RT Vol	210	0	0
Lane Flow Rate	235	349	357
Geometry Grp	1	1	1
Degree of Util (X)	0.333	0.483	0.489
Departure Headway (Hd)	5.085	5.085	5.037
Convergence, Y/N	Yes	Yes	Yes
Cap	711	713	722
Service Time	3.085	3.085	3.037
HCM Lane V/C Ratio	0.331	0.489	0.494
HCM Control Delay	10.6	12.7	12.8
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.5	2.6	2.7

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	7	0	372	256
Future Volume (vph)	11	0	7	0	372	256
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	60.0	60.0
Total Split (%)	29.4%	29.4%	29.4%	29.4%	70.6%	70.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	55.0	55.0
Actuated g/C Ratio		0.24		0.24	0.65	0.65
v/c Ratio		0.13		0.06	0.35	0.25
Control Delay		16.1		9.8	8.0	4.7
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		16.1		9.8	8.0	4.7
LOS		B		A	A	A
Approach Delay		16.1		9.8	8.0	4.7
Approach LOS		B		A	A	A

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 13 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.35	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 43.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	22	400	298
v/c Ratio	0.13	0.06	0.35	0.25
Control Delay	16.1	9.8	8.0	4.7
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.1	9.8	8.0	4.7
Queue Length 50th (ft)	10	0	87	41
Queue Length 95th (ft)	13	3	135	m58
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	379	346	1127	1171
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.06	0.35	0.25

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	3	5	380	6	10	253
Future Vol, veh/h	3	5	380	6	10	253
Conflicting Peds, #/hr	1	6	0	31	31	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	89	89	75	75
Heavy Vehicles, %	0	20	9	0	0	7
Mvmt Flow	4	7	427	7	13	337

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	826	467	0	0	465	0
Stage 1	461	-	-	-	-	-
Stage 2	365	-	-	-	-	-
Critical Hdwy	6.4	6.4	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.48	-	-	2.2	-
Pot Cap-1 Maneuver	345	560	-	-	1107	-
Stage 1	639	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	329	540	-	-	1101	-
Mov Cap-2 Maneuver	329	-	-	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	696	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.5	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	435	1101	-
HCM Lane V/C Ratio	-	-	0.027	0.012	-
HCM Control Delay (s)	-	-	13.5	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	34	10	0	70	367	3	279
Future Volume (vph)	34	10	0	70	367	3	279
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA
Protected Phases		4	8	5	2		6
Permitted Phases	4			2		6	
Detector Phase	4	4	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	25.0	25.0	25.0	12.0	60.0	48.0	48.0
Total Split (%)	29.4%	29.4%	29.4%	14.1%	70.6%	56.5%	56.5%
Yellow Time (s)	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?				Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	20.0	20.0	20.0		55.0		43.0
Actuated g/C Ratio	0.24	0.24	0.24		0.65		0.51
v/c Ratio	0.17	0.16	0.01		0.25		0.30
Control Delay	27.6	12.4	0.0		8.4		8.4
Queue Delay	0.0	0.0	0.0		0.0		0.0
Total Delay	27.6	12.4	0.0		8.4		8.4
LOS	C	B	A		A		A
Approach Delay		19.4			8.4		8.4
Approach LOS		B			A		A

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 70 (82%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.30	
Intersection Signal Delay: 9.5	Intersection LOS: A
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	60	4	456	488
v/c Ratio	0.17	0.16	0.01	0.25	0.30
Control Delay	27.6	12.4	0.0	8.4	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	12.4	0.0	8.4	8.4
Queue Length 50th (ft)	22	6	0	64	47
Queue Length 95th (ft)	37	22	0	m72	74
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	306	380	725	1832	1636
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.01	0.25	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	64	166	113	172	118	13	12	3
Future Volume (vph)	64	166	113	172	118	13	12	3
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	25.0		15.0		15.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.30		0.30
v/c Ratio	0.14	0.35	0.28	0.29		0.55		0.11
Control Delay	7.6	7.0	9.2	7.6		15.7		8.9
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.6	7.0	9.2	7.6		15.7		8.9
LOS	A	A	A	A		B		A
Approach Delay		7.1		8.2		15.7		8.9
Approach LOS		A		A		B		A

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.6	Intersection LOS: A
Intersection Capacity Utilization 52.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave

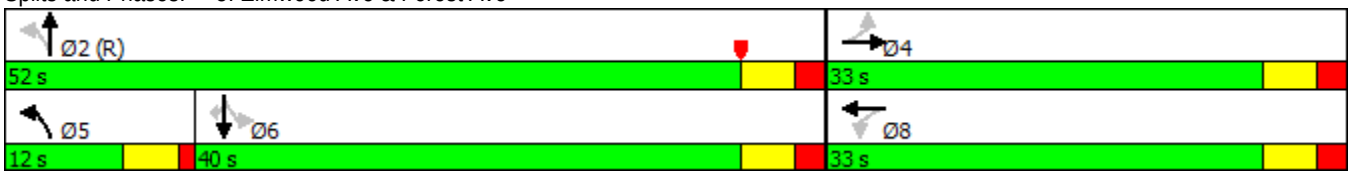
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	76	302	141	253	262	45
v/c Ratio	0.14	0.35	0.28	0.29	0.55	0.11
Control Delay	7.6	7.0	9.2	7.6	15.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	7.0	9.2	7.6	15.7	8.9
Queue Length 50th (ft)	11	35	22	35	44	4
Queue Length 95th (ft)	26	66	43	59	95	17
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	542	858	505	883	473	420
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.35	0.28	0.29	0.55	0.11

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	153	196	37	149	23	336	12	203	120
Future Volume (vph)	153	196	37	149	23	336	12	203	120
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	33.0	33.0	33.0	33.0	12.0	52.0	40.0	40.0	40.0
Total Split (%)	38.8%	38.8%	38.8%	38.8%	14.1%	61.2%	47.1%	47.1%	47.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		27.5		27.5		46.5		34.5	34.5
Actuated g/C Ratio		0.32		0.32		0.55		0.41	0.41
v/c Ratio		1.00		0.55		0.43		0.33	0.19
Control Delay		75.1		27.2		10.6		13.9	1.8
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		75.1		27.2		10.6		13.9	1.8
LOS		E		C		B		B	A
Approach Delay		75.1		27.2		10.6		9.6	
Approach LOS		E		C		B		A	

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 31.4	Intersection LOS: C
Intersection Capacity Utilization 87.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	408	273	424	231	129
v/c Ratio	1.00	0.55	0.43	0.33	0.19
Control Delay	75.1	27.2	10.6	13.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	75.1	27.2	10.6	13.9	1.8
Queue Length 50th (ft)	214	112	88	51	0
Queue Length 95th (ft)	#397	175	125	78	7
Internal Link Dist (ft)	78	128	326	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	409	500	978	705	675
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.00	0.55	0.43	0.33	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	3	253	0	0	221	4	8	0	26	12	0	5
Future Vol, veh/h	3	253	0	0	221	4	8	0	26	12	0	5
Conflicting Peds, #/hr	5	0	12	12	0	5	3	0	5	5	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	94	94	94	77	77	77	53	53	53
Heavy Vehicles, %	0	6	0	0	4	0	25	0	4	0	0	0
Mvmt Flow	4	320	0	0	235	4	10	0	34	23	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	244	0	-	-	-	0	568	572	325	592	-	245
Stage 1	-	-	-	-	-	-	328	328	-	242	-	-
Stage 2	-	-	-	-	-	-	240	244	-	350	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.35	6.5	6.24	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.725	4	3.336	3.5	-	3.3
Pot Cap-1 Maneuver	1334	-	0	0	-	-	401	433	712	421	0	799
Stage 1	-	-	0	0	-	-	639	651	-	766	0	-
Stage 2	-	-	0	0	-	-	715	708	-	671	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1330	-	-	-	-	-	394	429	709	396	-	793
Mov Cap-2 Maneuver	-	-	-	-	-	-	394	429	-	396	-	-
Stage 1	-	-	-	-	-	-	636	648	-	759	-	-
Stage 2	-	-	-	-	-	-	704	705	-	633	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	11.5	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	597	1330	-	-	-	396	793
HCM Lane V/C Ratio	0.074	0.003	-	-	-	0.057	0.012
HCM Control Delay (s)	11.5	7.7	0	-	-	14.6	9.6
HCM Lane LOS	B	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	0	-	-	-	0.2	0

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	260	22	0	20	216	4	0	0	0	0
Future Vol, veh/h	0	11	260	22	0	20	216	4	0	0	0	0
Peak Hour Factor	0.92	0.83	0.83	0.83	0.92	0.96	0.96	0.96	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	313	27	0	21	225	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.1	9.3	0
HCM LOS	B	A	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	8%	23%
Vol Thru, %	100%	89%	90%	55%
Vol Right, %	0%	8%	2%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	293	240	22
LT Vol	0	11	20	5
Through Vol	0	260	216	12
RT Vol	0	22	4	5
Lane Flow Rate	0	353	250	36
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.407	0.305	0.051
Departure Headway (Hd)	5.292	4.258	4.385	5.135
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	851	825	700
Service Time	3.309	2.258	2.389	3.148
HCM Lane V/C Ratio	0	0.415	0.303	0.051
HCM Control Delay	8.3	10.1	9.3	8.4
HCM Lane LOS	N	B	A	A
HCM 95th-tile Q	0	2	1.3	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	5	12	5
Future Vol, veh/h	0	5	12	5
Peak Hour Factor	0.92	0.61	0.61	0.61
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	8	20	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.4
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	14.9
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	57	195	13	0	78	196	10	0	36	167	1	0	8	131	7
Future Vol, veh/h	0	57	195	13	0	78	196	10	0	36	167	1	0	8	131	7
Peak Hour Factor	0.92	0.83	0.83	0.83	0.92	0.96	0.96	0.96	0.92	0.84	0.84	0.84	0.92	0.67	0.67	0.67
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	69	235	16	0	81	204	10	0	43	199	1	0	12	196	10
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16	15.3	14.2	13.4
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	22%	27%	5%
Vol Thru, %	82%	74%	69%	90%
Vol Right, %	0%	5%	4%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	204	265	284	146
LT Vol	36	57	78	8
Through Vol	167	195	196	131
RT Vol	1	13	10	7
Lane Flow Rate	243	319	296	218
Geometry Grp	1	1	1	1
Degree of Util (X)	0.43	0.538	0.504	0.387
Departure Headway (Hd)	6.372	6.069	6.134	6.387
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	563	594	586	562
Service Time	4.422	4.115	4.181	4.437
HCM Lane V/C Ratio	0.432	0.537	0.505	0.388
HCM Control Delay	14.2	16	15.3	13.4
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	2.1	3.2	2.8	1.8

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Traffic Vol, veh/h	0	201	3	0	23	279	0	5	168
Future Vol, veh/h	0	201	3	0	23	279	0	5	168
Peak Hour Factor	0.92	0.83	0.83	0.92	0.96	0.96	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	242	4	0	24	291	0	6	200
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.2	11.1	9.4
HCM LOS	B	B	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	3%	0%	8%
Vol Thru, %	0%	99%	92%
Vol Right, %	97%	1%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	204	302
LT Vol	5	0	23
Through Vol	0	201	279
RT Vol	168	3	0
Lane Flow Rate	206	246	315
Geometry Grp	1	1	1
Degree of Util (X)	0.266	0.326	0.413
Departure Headway (Hd)	4.643	4.778	4.723
Convergence, Y/N	Yes	Yes	Yes
Cap	768	747	758
Service Time	2.702	2.841	2.783
HCM Lane V/C Ratio	0.268	0.329	0.416
HCM Control Delay	9.4	10.2	11.1
HCM Lane LOS	A	B	B
HCM 95th-tile Q	1.1	1.4	2

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	13	0	493	361
Future Volume (vph)	11	0	13	0	493	361
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	75.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	70.0	70.0
Actuated g/C Ratio		0.20		0.20	0.70	0.70
v/c Ratio		0.10		0.09	0.44	0.31
Control Delay		18.0		16.1	7.9	3.2
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		18.0		16.1	7.9	3.2
LOS		B		B	A	A
Approach Delay		18.0		16.1	7.9	3.2
Approach LOS		B		B	A	A

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 13 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 6.6	Intersection LOS: A
Intersection Capacity Utilization 50.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	31	26	542	388
v/c Ratio	0.10	0.09	0.44	0.31
Control Delay	18.0	16.1	7.9	3.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.0	16.1	7.9	3.2
Queue Length 50th (ft)	5	2	131	42
Queue Length 95th (ft)	24	15	193	m50
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	314	278	1220	1267
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	0.09	0.44	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Vol, veh/h	3	12	488	19	15	358
Future Vol, veh/h	3	12	488	19	15	358
Conflicting Peds, #/hr	6	8	0	67	67	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	85	85	93	93
Heavy Vehicles, %	0	20	9	0	0	7
Mvmt Flow	4	16	574	22	16	385

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1075	660	0	0	663	0
Stage 1	652	-	-	-	-	-
Stage 2	423	-	-	-	-	-
Critical Hdwy	6.4	6.4	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.48	-	-	2.2	-
Pot Cap-1 Maneuver	245	433	-	-	935	-
Stage 1	522	-	-	-	-	-
Stage 2	665	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	223	402	-	-	928	-
Mov Cap-2 Maneuver	223	-	-	-	-	-
Stage 1	489	-	-	-	-	-
Stage 2	647	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	346	928	-
HCM Lane V/C Ratio	-	-	0.058	0.017	-
HCM Control Delay (s)	-	-	16	8.9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	85	14	4	0	93	375	10	405
Future Volume (vph)	85	14	4	0	93	375	10	405
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	30.0	30.0	30.0	30.0	14.0	70.0	56.0	56.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	14.0%	70.0%	56.0%	56.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0		5.0		5.0		5.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		65.0		51.0
Actuated g/C Ratio	0.25	0.25		0.25		0.65		0.51
v/c Ratio	0.32	0.29		0.03		0.30		0.36
Control Delay	33.9	10.1		28.8		9.5		14.0
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	33.9	10.1		28.8		9.5		14.0
LOS	C	B		C		A		B
Approach Delay		20.9		28.8		9.5		14.0
Approach LOS		C		C		A		B

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 70 (70%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 13.5	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	102	123	8	502	566
v/c Ratio	0.32	0.29	0.03	0.30	0.36
Control Delay	33.9	10.1	28.8	9.5	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	10.1	28.8	9.5	14.0
Queue Length 50th (ft)	53	8	4	98	97
Queue Length 95th (ft)	93	45	9	m104	136
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	322	420	301	1669	1591
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.29	0.03	0.30	0.36

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	191	200	215	134	3	19	5
Future Volume (vph)	21	191	200	215	134	3	19	5
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	25.0		15.0		15.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.30		0.30
v/c Ratio	0.04	0.48	0.54	0.30		0.58		0.22
Control Delay	6.7	7.4	19.1	12.0		17.1		9.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.7	7.4	19.1	12.0		17.1		9.4
LOS	A	A	B	B		B		A
Approach Delay		7.4		15.2		17.1		9.4
Approach LOS		A		B		B		A

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 12.5	Intersection LOS: B
Intersection Capacity Utilization 66.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave

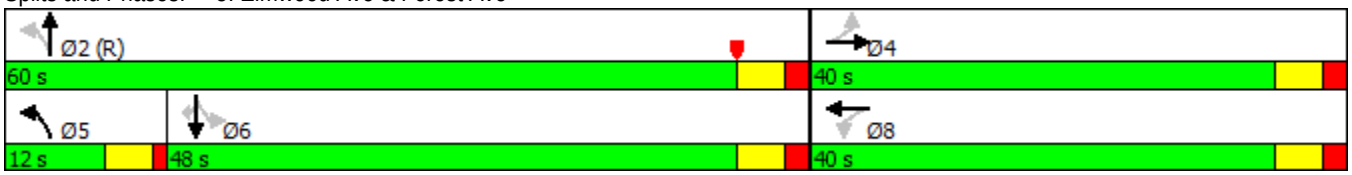
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	23	416	220	270	255	95
v/c Ratio	0.04	0.48	0.54	0.30	0.58	0.22
Control Delay	6.7	7.4	19.1	12.0	17.1	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	7.4	19.1	12.0	17.1	9.4
Queue Length 50th (ft)	3	43	73	78	44	10
Queue Length 95th (ft)	12	97	123	122	103	15
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	536	863	409	886	439	425
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.48	0.54	0.30	0.58	0.22

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	135	219	42	193	44	405	30	303	198
Future Volume (vph)	135	219	42	193	44	405	30	303	198
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	40.0	40.0	40.0	40.0	12.0	60.0	48.0	48.0	48.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	12.0%	60.0%	48.0%	48.0%	48.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		34.5		34.5		54.5		42.5	42.5
Actuated g/C Ratio		0.34		0.34		0.54		0.42	0.42
v/c Ratio		0.97		0.56		0.66		0.51	0.29
Control Delay		66.4		31.1		14.7		16.1	2.5
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		66.4		31.1		14.7		16.1	2.5
LOS		E		C		B		B	A
Approach Delay		66.4		31.1		14.7		11.0	
Approach LOS		E		C		B		B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Pretimed	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 27.6	Intersection LOS: C
Intersection Capacity Utilization 100.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	421	297	615	358	213
v/c Ratio	0.97	0.56	0.66	0.51	0.29
Control Delay	66.4	31.1	14.7	16.1	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	66.4	31.1	14.7	16.1	2.5
Queue Length 50th (ft)	269	149	133	169	0
Queue Length 95th (ft)	#445	230	168	265	3
Internal Link Dist (ft)	78	128	326	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	436	526	927	696	724
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.97	0.56	0.66	0.51	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Vol, veh/h	7	354	0	0	256	263	6	1	14	5	0	8
Future Vol, veh/h	7	354	0	0	256	263	6	1	14	5	0	8
Conflicting Peds, #/hr	10	0	26	26	0	10	7	0	4	4	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	88	88	88	66	66	66	46	46	46
Heavy Vehicles, %	0	6	0	0	4	0	25	0	4	0	0	0
Mvmt Flow	8	416	0	0	291	299	9	2	21	11	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	600	0	-	-	-	0	880	1033	420	898	-	457
Stage 1	-	-	-	-	-	-	433	433	-	450	-	-
Stage 2	-	-	-	-	-	-	447	600	-	448	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.35	6.5	6.24	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.725	4	3.336	3.5	-	3.3
Pot Cap-1 Maneuver	987	-	0	0	-	-	244	234	629	262	0	608
Stage 1	-	-	0	0	-	-	559	585	-	592	0	-
Stage 2	-	-	0	0	-	-	549	493	-	594	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	980	-	-	-	-	-	233	229	627	246	-	598
Mov Cap-2 Maneuver	-	-	-	-	-	-	233	229	-	246	-	-
Stage 1	-	-	-	-	-	-	553	579	-	580	-	-
Stage 2	-	-	-	-	-	-	529	488	-	564	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	14.8	14.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	400	980	-	-	-	246	598
HCM Lane V/C Ratio	0.08	0.008	-	-	-	0.044	0.029
HCM Control Delay (s)	14.8	8.7	0	-	-	20.3	11.2
HCM Lane LOS	B	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	-	0.1	0.1

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	5	336	28	0	9	251	4	0	0	0	0
Future Vol, veh/h	0	5	336	28	0	9	251	4	0	0	0	0
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	369	31	0	10	282	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	11.5	10.1	0
HCM LOS	B	B	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	1%	3%	10%
Vol Thru, %	100%	91%	95%	62%
Vol Right, %	0%	8%	2%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	369	264	48
LT Vol	0	5	9	5
Through Vol	0	336	251	30
RT Vol	0	28	4	13
Lane Flow Rate	0	405	297	52
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.489	0.369	0.077
Departure Headway (Hd)	5.544	4.341	4.483	5.298
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	831	804	675
Service Time	3.598	2.362	2.507	3.343
HCM Lane V/C Ratio	0	0.487	0.369	0.077
HCM Control Delay	8.6	11.5	10.1	8.8
HCM Lane LOS	N	B	B	A
HCM 95th-tile Q	0	2.7	1.7	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	5	30	13
Future Vol, veh/h	0	5	30	13
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	5	33	14
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.8
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	17
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	32	297	12	0	83	222	18	0	35	164	3	0	22	110	7
Future Vol, veh/h	0	32	297	12	0	83	222	18	0	35	164	3	0	22	110	7
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.86	0.86	0.86	0.92	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	35	326	13	0	93	249	20	0	41	191	3	0	27	134	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	18.9	18.5	14.7	13.1
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	9%	26%	16%
Vol Thru, %	81%	87%	69%	79%
Vol Right, %	1%	4%	6%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	202	341	323	139
LT Vol	35	32	83	22
Through Vol	164	297	222	110
RT Vol	3	12	18	7
Lane Flow Rate	235	375	363	170
Geometry Grp	1	1	1	1
Degree of Util (X)	0.433	0.63	0.615	0.32
Departure Headway (Hd)	6.634	6.057	6.098	6.801
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	540	596	592	527
Service Time	4.693	4.108	4.149	4.866
HCM Lane V/C Ratio	0.435	0.629	0.613	0.323
HCM Control Delay	14.7	18.9	18.5	13.1
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	2.2	4.4	4.2	1.4

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Traffic Vol, veh/h	0	322	0	0	15	307	0	16	213
Future Vol, veh/h	0	322	0	0	15	307	0	16	213
Peak Hour Factor	0.92	0.91	0.91	0.92	0.89	0.89	0.92	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	354	0	0	17	345	0	17	222
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	13.1	13.1	10.8
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	5%
Vol Thru, %	0%	100%	95%
Vol Right, %	93%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	229	322	322
LT Vol	16	0	15
Through Vol	0	322	307
RT Vol	213	0	0
Lane Flow Rate	239	354	362
Geometry Grp	1	1	1
Degree of Util (X)	0.341	0.499	0.5
Departure Headway (Hd)	5.146	5.081	5.104
Convergence, Y/N	Yes	Yes	Yes
Cap	701	711	709
Service Time	3.163	3.096	3.104
HCM Lane V/C Ratio	0.341	0.498	0.511
HCM Control Delay	10.8	13.1	13.1
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.5	2.8	2.8

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	7	0	374	263
Future Volume (vph)	11	0	7	0	374	263
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	60.0	60.0
Total Split (%)	29.4%	29.4%	29.4%	29.4%	70.6%	70.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	55.0	55.0
Actuated g/C Ratio		0.24		0.24	0.65	0.65
v/c Ratio		0.13		0.06	0.36	0.26
Control Delay		16.1		9.8	8.0	4.9
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		16.1		9.8	8.0	4.9
LOS		B		A	A	A
Approach Delay		16.1		9.8	8.0	4.9
Approach LOS		B		A	A	A

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 13 (15%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 45	
Control Type: Pretimed	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 7.3	Intersection LOS: A
Intersection Capacity Utilization 43.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	22	402	306
v/c Ratio	0.13	0.06	0.36	0.26
Control Delay	16.1	9.8	8.0	4.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	16.1	9.8	8.0	4.9
Queue Length 50th (ft)	10	0	87	43
Queue Length 95th (ft)	13	3	136	m61
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	379	346	1127	1171
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.13	0.06	0.36	0.26

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	5	382	6	10	260
Future Vol, veh/h	3	5	382	6	10	260
Conflicting Peds, #/hr	1	6	0	31	31	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	67	67	89	89	75	75
Heavy Vehicles, %	0	20	9	0	0	7
Mvmt Flow	4	7	429	7	13	347

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	838	470	0	0	467	0
Stage 1	464	-	-	-	-	-
Stage 2	374	-	-	-	-	-
Critical Hdwy	6.4	6.4	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.48	-	-	2.2	-
Pot Cap-1 Maneuver	339	558	-	-	1105	-
Stage 1	637	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	324	538	-	-	1099	-
Mov Cap-2 Maneuver	324	-	-	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	0.3
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	431	1099	-
HCM Lane V/C Ratio	-	-	0.028	0.012	-
HCM Control Delay (s)	-	-	13.6	8.3	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT
Lane Configurations							
Traffic Volume (vph)	34	10	0	70	375	3	280
Future Volume (vph)	34	10	0	70	375	3	280
Turn Type	Perm	NA	NA	pm+pt	NA	Perm	NA
Protected Phases		4	8	5	2		6
Permitted Phases	4			2		6	
Detector Phase	4	4	8	5	2	6	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	25.0	25.0	25.0	12.0	60.0	48.0	48.0
Total Split (%)	29.4%	29.4%	29.4%	14.1%	70.6%	56.5%	56.5%
Yellow Time (s)	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0		5.0		5.0
Lead/Lag				Lead		Lag	Lag
Lead-Lag Optimize?				Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	20.0	20.0	20.0		55.0		43.0
Actuated g/C Ratio	0.24	0.24	0.24		0.65		0.51
v/c Ratio	0.17	0.16	0.01		0.25		0.30
Control Delay	27.6	12.4	0.0		8.7		8.4
Queue Delay	0.0	0.0	0.0		0.0		0.0
Total Delay	27.6	12.4	0.0		8.7		8.4
LOS	C	B	A		A		A
Approach Delay		19.4			8.7		8.4
Approach LOS		B			A		A

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 70 (82%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.30	
Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	51	60	4	465	489
v/c Ratio	0.17	0.16	0.01	0.25	0.30
Control Delay	27.6	12.4	0.0	8.7	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	12.4	0.0	8.7	8.4
Queue Length 50th (ft)	22	6	0	68	48
Queue Length 95th (ft)	37	22	0	m76	74
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	306	380	718	1834	1636
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.16	0.01	0.25	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	64	167	113	177	118	13	12	3
Future Volume (vph)	64	167	113	177	118	13	12	3
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	25.0		15.0		15.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.30		0.30
v/c Ratio	0.14	0.35	0.28	0.29		0.55		0.11
Control Delay	7.6	7.0	9.2	7.7		15.7		8.9
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	7.6	7.0	9.2	7.7		15.7		8.9
LOS	A	A	A	A		B		A
Approach Delay		7.1		8.2		15.7		8.9
Approach LOS		A		A		B		A

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 9.7	Intersection LOS: A
Intersection Capacity Utilization 52.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave

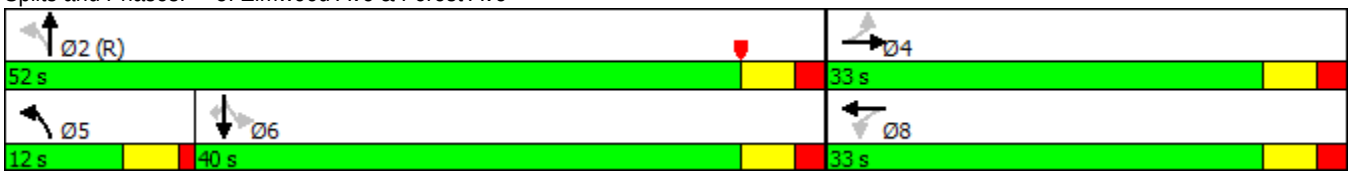
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	76	303	141	259	262	45
v/c Ratio	0.14	0.35	0.28	0.29	0.55	0.11
Control Delay	7.6	7.0	9.2	7.7	15.7	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.6	7.0	9.2	7.7	15.7	8.9
Queue Length 50th (ft)	11	35	22	36	44	4
Queue Length 95th (ft)	26	66	43	61	95	17
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	539	858	504	884	473	420
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.35	0.28	0.29	0.55	0.11

Intersection Summary

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	153	197	38	154	23	343	12	204	120
Future Volume (vph)	153	197	38	154	23	343	12	204	120
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	33.0	33.0	33.0	33.0	12.0	52.0	40.0	40.0	40.0
Total Split (%)	38.8%	38.8%	38.8%	38.8%	14.1%	61.2%	47.1%	47.1%	47.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		27.5		27.5		46.5		34.5	34.5
Actuated g/C Ratio		0.32		0.32		0.55		0.41	0.41
v/c Ratio		1.00		0.55		0.44		0.33	0.19
Control Delay		75.7		27.6		10.8		13.9	1.8
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		75.7		27.6		10.8		13.9	1.8
LOS		E		C		B		B	A
Approach Delay		75.7		27.6		10.8		9.6	
Approach LOS		E		C		B		A	

Intersection Summary	
Cycle Length: 85	
Actuated Cycle Length: 85	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 65	
Control Type: Pretimed	
Maximum v/c Ratio: 1.00	
Intersection Signal Delay: 31.6	Intersection LOS: C
Intersection Capacity Utilization 88.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	409	274	433	232	129
v/c Ratio	1.00	0.55	0.44	0.33	0.19
Control Delay	75.7	27.6	10.8	13.9	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	75.7	27.6	10.8	13.9	1.8
Queue Length 50th (ft)	215	114	91	51	0
Queue Length 95th (ft)	#399	177	129	79	7
Internal Link Dist (ft)	78	71	206	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	409	497	979	705	675
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.00	0.55	0.44	0.33	0.19

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	260	0	0	223	4	8	0	26	12	0	5
Future Vol, veh/h	3	260	0	0	223	4	8	0	26	12	0	5
Conflicting Peds, #/hr	5	0	12	12	0	5	3	0	5	5	0	3
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	94	94	94	77	77	77	53	53	53
Heavy Vehicles, %	0	6	0	0	4	0	25	0	4	0	0	0
Mvmt Flow	4	329	0	0	237	4	10	0	34	23	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	246	0	-	-	-	0	579	583	334	603	-	247
Stage 1	-	-	-	-	-	-	337	337	-	244	-	-
Stage 2	-	-	-	-	-	-	242	246	-	359	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.35	6.5	6.24	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.725	4	3.336	3.5	-	3.3
Pot Cap-1 Maneuver	1332	-	0	0	-	-	394	427	703	414	0	797
Stage 1	-	-	0	0	-	-	632	645	-	764	0	-
Stage 2	-	-	0	0	-	-	713	706	-	663	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	1328	-	-	-	-	-	387	423	700	389	-	791
Mov Cap-2 Maneuver	-	-	-	-	-	-	387	423	-	389	-	-
Stage 1	-	-	-	-	-	-	629	642	-	757	-	-
Stage 2	-	-	-	-	-	-	702	703	-	626	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	11.6	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	588	1328	-	-	-	389	791
HCM Lane V/C Ratio	0.075	0.003	-	-	-	0.058	0.012
HCM Control Delay (s)	11.6	7.7	0	-	-	14.8	9.6
HCM Lane LOS	B	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.2	0	-	-	-	0.2	0

Intersection	
Intersection Delay, s/veh	9.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	11	267	22	0	20	218	4	0	0	0	0
Future Vol, veh/h	0	11	267	22	0	20	218	4	0	0	0	0
Peak Hour Factor	0.92	0.83	0.83	0.83	0.92	0.96	0.96	0.96	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	322	27	0	21	227	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	10.4	9.4	0
HCM LOS	B	A	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	4%	8%	23%
Vol Thru, %	100%	89%	90%	55%
Vol Right, %	0%	7%	2%	23%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	300	242	22
LT Vol	0	11	20	5
Through Vol	0	267	218	12
RT Vol	0	22	4	5
Lane Flow Rate	0	361	252	36
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.428	0.308	0.052
Departure Headway (Hd)	5.314	4.263	4.393	5.156
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	849	819	694
Service Time	3.353	2.263	2.409	3.19
HCM Lane V/C Ratio	0	0.425	0.308	0.052
HCM Control Delay	8.4	10.4	9.4	8.5
HCM Lane LOS	N	B	A	A
HCM 95th-tile Q	0	2.2	1.3	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	5	12	5
Future Vol, veh/h	0	5	12	5
Peak Hour Factor	0.92	0.61	0.61	0.61
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	8	20	8
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.5
HCM LOS	A

Intersection	
Intersection Delay, s/veh	15.2
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	57	202	13	0	78	198	10	0	36	167	1	0	8	131	7
Future Vol, veh/h	0	57	202	13	0	78	198	10	0	36	167	1	0	8	131	7
Peak Hour Factor	0.92	0.83	0.83	0.83	0.92	0.96	0.96	0.96	0.92	0.84	0.84	0.84	0.92	0.67	0.67	0.67
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	69	243	16	0	81	206	10	0	43	199	1	0	12	196	10
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	16.5	15.5	14.3	13.6
HCM LOS	C	C	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	18%	21%	27%	5%
Vol Thru, %	82%	74%	69%	90%
Vol Right, %	0%	5%	3%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	204	272	286	146
LT Vol	36	57	78	8
Through Vol	167	202	198	131
RT Vol	1	13	10	7
Lane Flow Rate	243	328	298	218
Geometry Grp	1	1	1	1
Degree of Util (X)	0.433	0.554	0.51	0.39
Departure Headway (Hd)	6.42	6.089	6.168	6.435
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	561	593	584	558
Service Time	4.47	4.135	4.215	4.486
HCM Lane V/C Ratio	0.433	0.553	0.51	0.391
HCM Control Delay	14.3	16.5	15.5	13.6
HCM Lane LOS	B	C	C	B
HCM 95th-tile Q	2.2	3.4	2.9	1.8

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Lane Configurations									
Traffic Vol, veh/h	0	208	3	0	23	281	0	5	168
Future Vol, veh/h	0	208	3	0	23	281	0	5	168
Peak Hour Factor	0.92	0.83	0.83	0.92	0.96	0.96	0.92	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	251	4	0	24	293	0	6	200
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.3	11.2	9.4
HCM LOS	B	B	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	3%	0%	8%
Vol Thru, %	0%	99%	92%
Vol Right, %	97%	1%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	211	304
LT Vol	5	0	23
Through Vol	0	208	281
RT Vol	168	3	0
Lane Flow Rate	206	254	317
Geometry Grp	1	1	1
Degree of Util (X)	0.267	0.338	0.417
Departure Headway (Hd)	4.666	4.783	4.736
Convergence, Y/N	Yes	Yes	Yes
Cap	764	747	757
Service Time	2.729	2.847	2.796
HCM Lane V/C Ratio	0.27	0.34	0.419
HCM Control Delay	9.4	10.3	11.2
HCM Lane LOS	A	B	B
HCM 95th-tile Q	1.1	1.5	2.1

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	241	1	2	234	7	6
Future Vol, veh/h	241	1	2	234	7	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	262	1	2	254	8	7

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	263	0	522	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	259	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1301	-	515	776
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	784	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1301	-	514	776
Mov Cap-2 Maneuver	-	-	-	-	514	-
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	609	-	-	1301	-
HCM Lane V/C Ratio	0.023	-	-	0.002	-
HCM Control Delay (s)	11.1	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	6	8	385	2	1	255
Future Vol, veh/h	6	8	385	2	1	255
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	9	418	2	1	277

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	699	420	0	0	421	0
Stage 1	420	-	-	-	-	-
Stage 2	279	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	406	633	-	-	1138	-
Stage 1	663	-	-	-	-	-
Stage 2	768	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	406	633	-	-	1138	-
Mov Cap-2 Maneuver	406	-	-	-	-	-
Stage 1	663	-	-	-	-	-
Stage 2	767	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	511	1138	-
HCM Lane V/C Ratio	-	-	0.03	0.001	-
HCM Control Delay (s)	-	-	12.3	8.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	13	0	508	368
Future Volume (vph)	11	0	13	0	508	368
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	75.0	75.0
Total Split (%)	25.0%	25.0%	25.0%	25.0%	75.0%	75.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	70.0	70.0
Actuated g/C Ratio		0.20		0.20	0.70	0.70
v/c Ratio		0.10		0.09	0.46	0.31
Control Delay		18.0		16.1	8.1	3.3
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		18.0		16.1	8.1	3.3
LOS		B		B	A	A
Approach Delay		18.0		16.1	8.1	3.3
Approach LOS		B		B	A	A

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 13 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 6.7	Intersection LOS: A
Intersection Capacity Utilization 50.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	31	26	558	396
v/c Ratio	0.10	0.09	0.46	0.31
Control Delay	18.0	16.1	8.1	3.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	18.0	16.1	8.1	3.3
Queue Length 50th (ft)	5	2	137	45
Queue Length 95th (ft)	24	15	201	m50
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	314	278	1220	1267
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.10	0.09	0.46	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	12	503	19	15	365
Future Vol, veh/h	3	12	503	19	15	365
Conflicting Peds, #/hr	6	8	0	67	67	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	85	85	93	93
Heavy Vehicles, %	0	20	9	0	0	7
Mvmt Flow	4	16	592	22	16	392

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1101	678	0	0	681	0
Stage 1	670	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Critical Hdwy	6.4	6.4	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.48	-	-	2.2	-
Pot Cap-1 Maneuver	237	422	-	-	921	-
Stage 1	512	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	216	392	-	-	914	-
Mov Cap-2 Maneuver	216	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	642	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	337	914	-
HCM Lane V/C Ratio	-	-	0.059	0.018	-
HCM Control Delay (s)	-	-	16.4	9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	85	14	4	0	93	380	10	411
Future Volume (vph)	85	14	4	0	93	380	10	411
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	30.0	30.0	30.0	30.0	14.0	70.0	56.0	56.0
Total Split (%)	30.0%	30.0%	30.0%	30.0%	14.0%	70.0%	56.0%	56.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0		5.0		5.0		5.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		65.0		51.0
Actuated g/C Ratio	0.25	0.25		0.25		0.65		0.51
v/c Ratio	0.32	0.29		0.03		0.30		0.36
Control Delay	33.9	10.1		28.8		9.5		14.1
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	33.9	10.1		28.8		9.5		14.1
LOS	C	B		C		A		B
Approach Delay		20.9		28.8		9.5		14.1
Approach LOS		C		C		A		B

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 70 (70%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.36	
Intersection Signal Delay: 13.6	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd

Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	102	123	8	507	573
v/c Ratio	0.32	0.29	0.03	0.30	0.36
Control Delay	33.9	10.1	28.8	9.5	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.9	10.1	28.8	9.5	14.1
Queue Length 50th (ft)	53	8	4	101	100
Queue Length 95th (ft)	93	45	9	m101	138
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	322	420	301	1668	1592
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.32	0.29	0.03	0.30	0.36

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	210	200	231	134	3	19	5
Future Volume (vph)	21	210	200	231	134	3	19	5
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	30.0	30.0	20.0	20.0	20.0	20.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0	25.0	25.0		15.0		15.0
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.30		0.30
v/c Ratio	0.04	0.51	0.56	0.33		0.58		0.22
Control Delay	6.8	8.1	19.8	12.1		17.1		9.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	6.8	8.1	19.8	12.1		17.1		9.4
LOS	A	A	B	B		B		A
Approach Delay		8.1		15.4		17.1		9.4
Approach LOS		A		B		B		A

Intersection Summary	
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.58	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	23	436	220	288	255	95
v/c Ratio	0.04	0.51	0.56	0.33	0.58	0.22
Control Delay	6.8	8.1	19.8	12.1	17.1	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	8.1	19.8	12.1	17.1	9.4
Queue Length 50th (ft)	3	50	76	88	44	10
Queue Length 95th (ft)	12	108	m127	126	103	15
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	527	860	392	886	439	425
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.51	0.56	0.33	0.58	0.22

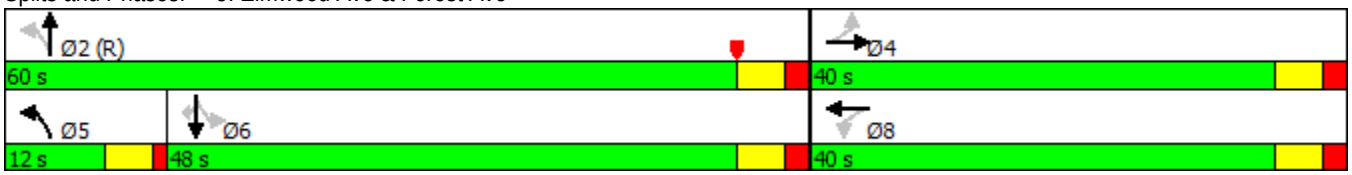
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	135	237	46	209	44	408	32	307	198
Future Volume (vph)	135	237	46	209	44	408	32	307	198
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	40.0	40.0	40.0	40.0	12.0	60.0	48.0	48.0	48.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	12.0%	60.0%	48.0%	48.0%	48.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		34.5		34.5		54.5		42.5	42.5
Actuated g/C Ratio		0.34		0.34		0.54		0.42	0.42
v/c Ratio		1.03		0.62		0.68		0.53	0.29
Control Delay		82.2		33.0		15.5		16.2	2.4
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		82.2		33.0		15.5		16.2	2.4
LOS		F		C		B		B	A
Approach Delay		82.2		33.0		15.5		11.2	
Approach LOS		F		C		B		B	

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 32.0	Intersection LOS: C
Intersection Capacity Utilization 101.5%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	442	322	627	364	213
v/c Ratio	1.03	0.62	0.68	0.53	0.29
Control Delay	82.2	33.0	15.5	16.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	82.2	33.0	15.5	16.2	2.4
Queue Length 50th (ft)	~306	166	143	172	0
Queue Length 95th (ft)	#477	253	180	269	2
Internal Link Dist (ft)	78	81	216	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	429	520	922	691	724
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.03	0.62	0.68	0.53	0.29

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	384	0	0	277	263	6	1	14	5	0	8
Future Vol, veh/h	7	384	0	0	277	263	6	1	14	5	0	8
Conflicting Peds, #/hr	10	0	26	26	0	10	7	0	4	4	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	88	88	88	66	66	66	46	46	46
Heavy Vehicles, %	0	6	0	0	4	0	25	0	4	0	0	0
Mvmt Flow	8	452	0	0	315	299	9	2	21	11	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	624	0	-	-	-	0	939	1092	456	958	-	481
Stage 1	-	-	-	-	-	-	468	468	-	474	-	-
Stage 2	-	-	-	-	-	-	471	624	-	484	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.35	6.5	6.24	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.725	4	3.336	3.5	-	3.3
Pot Cap-1 Maneuver	967	-	0	0	-	-	222	216	600	239	0	589
Stage 1	-	-	0	0	-	-	534	565	-	575	0	-
Stage 2	-	-	0	0	-	-	532	481	-	568	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	961	-	-	-	-	-	212	212	598	224	-	580
Mov Cap-2 Maneuver	-	-	-	-	-	-	212	212	-	224	-	-
Stage 1	-	-	-	-	-	-	528	559	-	563	-	-
Stage 2	-	-	-	-	-	-	513	476	-	538	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	15.6	15.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	372	961	-	-	-	224	580
HCM Lane V/C Ratio	0.086	0.009	-	-	-	0.049	0.03
HCM Control Delay (s)	15.6	8.8	0	-	-	21.9	11.4
HCM Lane LOS	C	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	-	0.2	0.1

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	5	366	28	0	9	272	4	0	0	0	0
Future Vol, veh/h	0	5	366	28	0	9	272	4	0	0	0	0
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	402	31	0	10	306	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	12.3	10.6	0
HCM LOS	B	B	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	1%	3%	10%
Vol Thru, %	100%	92%	95%	62%
Vol Right, %	0%	7%	1%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	399	285	48
LT Vol	0	5	9	5
Through Vol	0	366	272	30
RT Vol	0	28	4	13
Lane Flow Rate	0	438	320	52
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.533	0.402	0.078
Departure Headway (Hd)	5.668	4.373	4.521	5.416
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	824	797	659
Service Time	3.732	2.396	2.547	3.47
HCM Lane V/C Ratio	0	0.532	0.402	0.079
HCM Control Delay	8.7	12.3	10.6	8.9
HCM Lane LOS	N	B	B	A
HCM 95th-tile Q	0	3.2	2	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	5	30	13
Future Vol, veh/h	0	5	30	13
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	5	33	14
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.9
HCM LOS	A

Intersection	
Intersection Delay, s/veh	19.4
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	32	327	12	0	83	243	18	0	35	164	3	0	22	110	7
Future Vol, veh/h	0	32	327	12	0	83	243	18	0	35	164	3	0	22	110	7
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.86	0.86	0.86	0.92	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	35	359	13	0	93	273	20	0	41	191	3	0	27	134	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	22.5	21.1	15.5	13.6
HCM LOS	C	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	9%	24%	16%
Vol Thru, %	81%	88%	71%	79%
Vol Right, %	1%	3%	5%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	202	371	344	139
LT Vol	35	32	83	22
Through Vol	164	327	243	110
RT Vol	3	12	18	7
Lane Flow Rate	235	408	387	170
Geometry Grp	1	1	1	1
Degree of Util (X)	0.448	0.7	0.669	0.332
Departure Headway (Hd)	6.871	6.177	6.234	7.054
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	521	583	576	507
Service Time	4.945	4.239	4.299	5.138
HCM Lane V/C Ratio	0.451	0.7	0.672	0.335
HCM Control Delay	15.5	22.5	21.1	13.6
HCM Lane LOS	C	C	C	B
HCM 95th-tile Q	2.3	5.6	5	1.4

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Lane Configurations									
Traffic Vol, veh/h	0	352	0	0	15	328	0	16	213
Future Vol, veh/h	0	352	0	0	15	328	0	16	213
Peak Hour Factor	0.92	0.91	0.91	0.92	0.89	0.89	0.92	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	387	0	0	17	369	0	17	222
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	14.3	14.3	11.2
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	4%
Vol Thru, %	0%	100%	96%
Vol Right, %	93%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	229	352	343
LT Vol	16	0	15
Through Vol	0	352	328
RT Vol	213	0	0
Lane Flow Rate	239	387	385
Geometry Grp	1	1	1
Degree of Util (X)	0.351	0.552	0.551
Departure Headway (Hd)	5.29	5.138	5.148
Convergence, Y/N	Yes	Yes	Yes
Cap	680	704	701
Service Time	3.327	3.168	3.178
HCM Lane V/C Ratio	0.351	0.55	0.549
HCM Control Delay	11.2	14.3	14.3
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.6	3.4	3.4

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	335	27	21	270	22	29
Future Vol, veh/h	335	27	21	270	22	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	29	23	293	24	32

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	393	0	718	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	339	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1166	-	396	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1166	-	386	668
Mov Cap-2 Maneuver	-	-	-	-	386	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	705	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	508	-	-	1166	-
HCM Lane V/C Ratio	0.109	-	-	0.02	-
HCM Control Delay (s)	13	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	507	8	5	365
Future Vol, veh/h	3	4	507	8	5	365
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	4	551	9	5	397

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	963	555	0	0	560	0
Stage 1	555	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	284	531	-	-	1011	-
Stage 1	575	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	282	531	-	-	1011	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	575	-	-	-	-	-
Stage 2	667	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	385	1011	-
HCM Lane V/C Ratio	-	-	0.02	0.005	-
HCM Control Delay (s)	-	-	14.5	8.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Traffic Volume (vph)	11	0	13	0	508	368
Future Volume (vph)	11	0	13	0	508	368
Turn Type	Perm	NA	Perm	NA	NA	NA
Protected Phases		4		8	2	6
Permitted Phases	4		8			
Detector Phase	4	4	8	8	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	21.0	21.0
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0	0.0	0.0
Total Lost Time (s)		5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		20.0		20.0	50.0	50.0
Actuated g/C Ratio		0.25		0.25	0.62	0.62
v/c Ratio		0.08		0.07	0.51	0.35
Control Delay		11.1		9.8	10.4	4.5
Queue Delay		0.0		0.0	0.0	0.0
Total Delay		11.1		9.8	10.4	4.5
LOS		B		A	B	A
Approach Delay		11.1		9.8	10.4	4.5
Approach LOS		B		A	B	A

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 10 (13%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow	
Natural Cycle: 55	
Control Type: Pretimed	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 8.1	Intersection LOS: A
Intersection Capacity Utilization 50.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Elmwood Ave & Bird Ave

Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	31	26	558	396
v/c Ratio	0.08	0.07	0.51	0.35
Control Delay	11.1	9.8	10.4	4.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	11.1	9.8	10.4	4.5
Queue Length 50th (ft)	2	0	137	44
Queue Length 95th (ft)	17	10	213	m65
Internal Link Dist (ft)	345	255	353	208
Turn Bay Length (ft)				
Base Capacity (vph)	398	353	1089	1131
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.08	0.07	0.51	0.35

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	12	503	19	15	365
Future Vol, veh/h	3	12	503	19	15	365
Conflicting Peds, #/hr	6	8	0	67	67	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	75	75	85	85	93	93
Heavy Vehicles, %	0	20	9	0	0	7
Mvmt Flow	4	16	592	22	16	392

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1101	678	0	0	681	0
Stage 1	670	-	-	-	-	-
Stage 2	431	-	-	-	-	-
Critical Hdwy	6.4	6.4	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.48	-	-	2.2	-
Pot Cap-1 Maneuver	237	422	-	-	921	-
Stage 1	512	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	216	392	-	-	914	-
Mov Cap-2 Maneuver	216	-	-	-	-	-
Stage 1	479	-	-	-	-	-
Stage 2	642	-	-	-	-	-

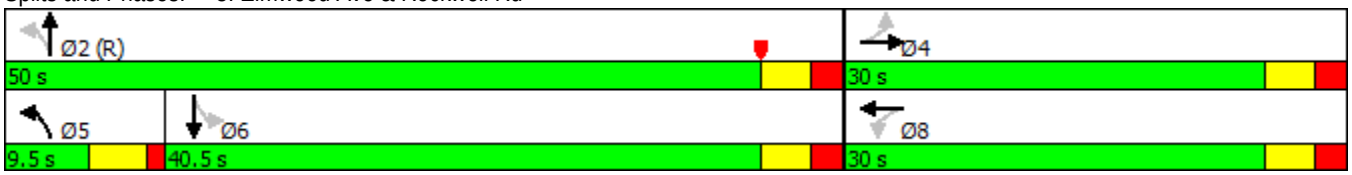
Approach	WB	NB	SB
HCM Control Delay, s	16.4	0	0.4
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	337	914	-
HCM Lane V/C Ratio	-	-	0.059	0.018	-
HCM Control Delay (s)	-	-	16.4	9	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0.1	-

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	85	14	4	0	93	380	10	411
Future Volume (vph)	85	14	4	0	93	380	10	411
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA
Protected Phases		4		8	5	2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	5	2	6	6
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	24.0	24.0	9.5	26.0	26.0	26.0
Total Split (s)	30.0	30.0	30.0	30.0	9.5	50.0	40.5	40.5
Total Split (%)	37.5%	37.5%	37.5%	37.5%	11.9%	62.5%	50.6%	50.6%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0		5.0		5.0		5.0
Lead/Lag					Lead		Lag	Lag
Lead-Lag Optimize?					Yes			
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	25.0	25.0		25.0		45.0		35.5
Actuated g/C Ratio	0.31	0.31		0.31		0.56		0.44
v/c Ratio	0.25	0.24		0.02		0.36		0.41
Control Delay	22.6	7.3		19.2		8.1		14.7
Queue Delay	0.0	0.0		0.0		0.0		0.0
Total Delay	22.6	7.3		19.2		8.1		14.7
LOS	C	A		B		A		B
Approach Delay		14.2		19.3		8.1		14.7
Approach LOS		B		B		A		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 56 (70%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Pretimed	
Maximum v/c Ratio: 0.41	
Intersection Signal Delay: 12.1	Intersection LOS: B
Intersection Capacity Utilization 63.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Elmwood Ave & Rockwell Rd



Lane Group	EBL	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	102	123	8	507	573
v/c Ratio	0.25	0.24	0.02	0.36	0.41
Control Delay	22.6	7.3	19.2	8.1	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.6	7.3	19.2	8.1	14.7
Queue Length 50th (ft)	38	6	3	58	88
Queue Length 95th (ft)	70	36	7	m78	128
Internal Link Dist (ft)		104	418	1366	682
Turn Bay Length (ft)					
Base Capacity (vph)	406	503	388	1425	1400
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.25	0.24	0.02	0.36	0.41

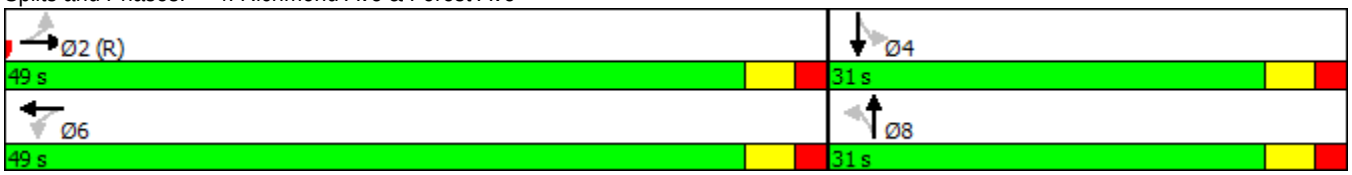
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	21	210	200	231	134	3	19	5
Future Volume (vph)	21	210	200	231	134	3	19	5
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	2	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	30.0	30.0	24.0	24.0	20.0	20.0	20.0	20.0
Total Split (s)	49.0	49.0	49.0	49.0	31.0	31.0	31.0	31.0
Total Split (%)	61.3%	61.3%	61.3%	61.3%	38.8%	38.8%	38.8%	38.8%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	44.0	44.0	44.0	44.0		26.0		26.0
Actuated g/C Ratio	0.55	0.55	0.55	0.55		0.32		0.32
v/c Ratio	0.04	0.48	0.53	0.30		0.55		0.21
Control Delay	8.6	10.5	12.7	6.9		23.6		12.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay	8.6	10.5	12.7	6.9		23.6		12.4
LOS	A	B	B	A		C		B
Approach Delay		10.4		9.4		23.6		12.4
Approach LOS		B		A		C		B

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:EBTL, Start of Green	
Natural Cycle: 50	
Control Type: Pretimed	
Maximum v/c Ratio: 0.55	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Richmond Ave & Forest Ave



Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group Flow (vph)	23	436	220	288	255	95
v/c Ratio	0.04	0.48	0.53	0.30	0.55	0.21
Control Delay	8.6	10.5	12.7	6.9	23.6	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	10.5	12.7	6.9	23.6	12.4
Queue Length 50th (ft)	5	94	30	27	85	16
Queue Length 95th (ft)	15	164	m111	m79	157	20
Internal Link Dist (ft)		102		100	574	498
Turn Bay Length (ft)						
Base Capacity (vph)	556	915	418	970	461	451
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.48	0.53	0.30	0.55	0.21

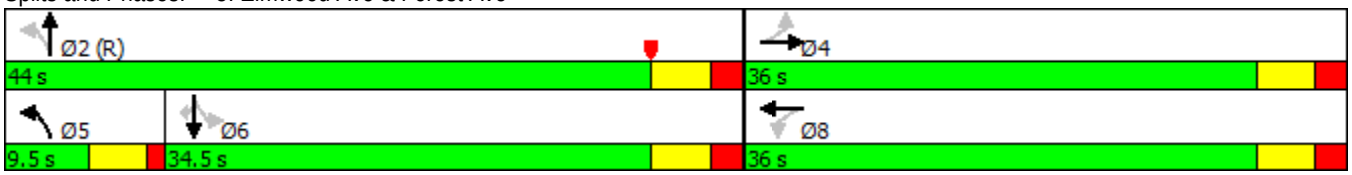
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	135	237	46	209	44	408	32	307	198
Future Volume (vph)	135	237	46	209	44	408	32	307	198
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases		4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.5	24.5	24.5	24.5	9.5	26.5	26.5	26.5	26.5
Total Split (s)	36.0	36.0	36.0	36.0	9.5	44.0	34.5	34.5	34.5
Total Split (%)	45.0%	45.0%	45.0%	45.0%	11.9%	55.0%	43.1%	43.1%	43.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	2.0	2.0	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	0.0
Total Lost Time (s)		5.5		5.5		5.5		5.5	5.5
Lead/Lag					Lead		Lag	Lag	Lag
Lead-Lag Optimize?					Yes				
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		30.5		30.5		38.5		29.0	29.0
Actuated g/C Ratio		0.38		0.38		0.48		0.36	0.36
v/c Ratio		0.88		0.55		0.81		0.62	0.32
Control Delay		40.4		23.1		20.9		16.9	1.5
Queue Delay		0.0		0.0		0.0		0.0	0.0
Total Delay		40.4		23.1		20.9		16.9	1.5
LOS		D		C		C		B	A
Approach Delay		40.4		23.1		20.9		11.2	
Approach LOS		D		C		C		B	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Yellow	
Natural Cycle: 75	
Control Type: Pretimed	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 101.5%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 5: Elmwood Ave & Forest Ave



Lane Group	EBT	WBT	NBT	SBT	SBR
Lane Group Flow (vph)	442	322	627	364	213
v/c Ratio	0.88	0.55	0.81	0.62	0.32
Control Delay	40.4	23.1	20.9	16.9	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	23.1	20.9	16.9	1.5
Queue Length 50th (ft)	163	120	126	57	0
Queue Length 95th (ft)	#354	194	#170	88	2
Internal Link Dist (ft)	78	81	216	1366	
Turn Bay Length (ft)					
Base Capacity (vph)	503	589	776	589	657
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.88	0.55	0.81	0.62	0.32

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	384	0	0	277	263	6	1	14	5	0	8
Future Vol, veh/h	7	384	0	0	277	263	6	1	14	5	0	8
Conflicting Peds, #/hr	10	0	26	26	0	10	7	0	4	4	0	7
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	88	88	88	66	66	66	46	46	46
Heavy Vehicles, %	0	6	0	0	4	0	25	0	4	0	0	0
Mvmt Flow	8	452	0	0	315	299	9	2	21	11	0	17

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	624	0	-	-	-	0	939	1092	456	958	-	481
Stage 1	-	-	-	-	-	-	468	468	-	474	-	-
Stage 2	-	-	-	-	-	-	471	624	-	484	-	-
Critical Hdwy	4.1	-	-	-	-	-	7.35	6.5	6.24	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.35	5.5	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	-	-	-	3.725	4	3.336	3.5	-	3.3
Pot Cap-1 Maneuver	967	-	0	0	-	-	222	216	600	239	0	589
Stage 1	-	-	0	0	-	-	534	565	-	575	0	-
Stage 2	-	-	0	0	-	-	532	481	-	568	0	-
Platoon blocked, %		-			-	-						
Mov Cap-1 Maneuver	961	-	-	-	-	-	212	212	598	224	-	580
Mov Cap-2 Maneuver	-	-	-	-	-	-	212	212	-	224	-	-
Stage 1	-	-	-	-	-	-	528	559	-	563	-	-
Stage 2	-	-	-	-	-	-	513	476	-	538	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	0	15.6	15.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	372	961	-	-	-	224	580
HCM Lane V/C Ratio	0.086	0.009	-	-	-	0.049	0.03
HCM Control Delay (s)	15.6	8.8	0	-	-	21.9	11.4
HCM Lane LOS	C	A	A	-	-	C	B
HCM 95th %tile Q(veh)	0.3	0	-	-	-	0.2	0.1

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	5	366	28	0	9	272	4	0	0	0	0
Future Vol, veh/h	0	5	366	28	0	9	272	4	0	0	0	0
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.25	0.25	0.25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	402	31	0	10	306	4	0	0	0	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	12.3	10.6	0
HCM LOS	B	B	-

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	0%	1%	3%	10%
Vol Thru, %	100%	92%	95%	62%
Vol Right, %	0%	7%	1%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	399	285	48
LT Vol	0	5	9	5
Through Vol	0	366	272	30
RT Vol	0	28	4	13
Lane Flow Rate	0	438	320	52
Geometry Grp	1	1	1	1
Degree of Util (X)	0	0.533	0.402	0.078
Departure Headway (Hd)	5.668	4.373	4.521	5.416
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	0	824	797	659
Service Time	3.732	2.396	2.547	3.47
HCM Lane V/C Ratio	0	0.532	0.402	0.079
HCM Control Delay	8.7	12.3	10.6	8.9
HCM Lane LOS	N	B	B	A
HCM 95th-tile Q	0	3.2	2	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations				
Traffic Vol, veh/h	0	5	30	13
Future Vol, veh/h	0	5	30	13
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	5	33	14
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.9
HCM LOS	A

Intersection	
Intersection Delay, s/veh	19.4
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations																
Traffic Vol, veh/h	0	32	327	12	0	83	243	18	0	35	164	3	0	22	110	7
Future Vol, veh/h	0	32	327	12	0	83	243	18	0	35	164	3	0	22	110	7
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.89	0.89	0.89	0.92	0.86	0.86	0.86	0.92	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	35	359	13	0	93	273	20	0	41	191	3	0	27	134	9
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	22.5	21.1	15.5	13.6
HCM LOS	C	C	C	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	17%	9%	24%	16%
Vol Thru, %	81%	88%	71%	79%
Vol Right, %	1%	3%	5%	5%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	202	371	344	139
LT Vol	35	32	83	22
Through Vol	164	327	243	110
RT Vol	3	12	18	7
Lane Flow Rate	235	408	387	170
Geometry Grp	1	1	1	1
Degree of Util (X)	0.448	0.7	0.669	0.332
Departure Headway (Hd)	6.871	6.177	6.234	7.054
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	521	583	576	507
Service Time	4.945	4.239	4.299	5.138
HCM Lane V/C Ratio	0.451	0.7	0.672	0.335
HCM Control Delay	15.5	22.5	21.1	13.6
HCM Lane LOS	C	C	C	B
HCM 95th-tile Q	2.3	5.6	5	1.4

Intersection	
Intersection Delay, s/veh	13.6
Intersection LOS	B

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Lane Configurations									
Traffic Vol, veh/h	0	352	0	0	15	328	0	16	213
Future Vol, veh/h	0	352	0	0	15	328	0	16	213
Peak Hour Factor	0.92	0.91	0.91	0.92	0.89	0.89	0.92	0.96	0.96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	387	0	0	17	369	0	17	222
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	14.3	14.3	11.2
HCM LOS	B	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	7%	0%	4%
Vol Thru, %	0%	100%	96%
Vol Right, %	93%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	229	352	343
LT Vol	16	0	15
Through Vol	0	352	328
RT Vol	213	0	0
Lane Flow Rate	239	387	385
Geometry Grp	1	1	1
Degree of Util (X)	0.351	0.552	0.551
Departure Headway (Hd)	5.29	5.138	5.148
Convergence, Y/N	Yes	Yes	Yes
Cap	680	704	701
Service Time	3.327	3.168	3.178
HCM Lane V/C Ratio	0.351	0.55	0.549
HCM Control Delay	11.2	14.3	14.3
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.6	3.4	3.4

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	335	27	21	270	22	29
Future Vol, veh/h	335	27	21	270	22	29
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	364	29	23	293	24	32

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	393	0	718	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	339	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1166	-	396	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	722	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1166	-	386	668
Mov Cap-2 Maneuver	-	-	-	-	386	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	705	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.6	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	508	-	-	1166	-
HCM Lane V/C Ratio	0.109	-	-	0.02	-
HCM Control Delay (s)	13	-	-	8.1	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.4	-	-	0.1	-

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	3	4	507	8	5	365
Future Vol, veh/h	3	4	507	8	5	365
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	4	551	9	5	397

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	963	555	0	0	560	0
Stage 1	555	-	-	-	-	-
Stage 2	408	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	284	531	-	-	1011	-
Stage 1	575	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	282	531	-	-	1011	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	575	-	-	-	-	-
Stage 2	667	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	14.5	0	0.1
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	385	1011	-
HCM Lane V/C Ratio	-	-	0.02	0.005	-
HCM Control Delay (s)	-	-	14.5	8.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Appendix C:

Trip Generation Information

Trip Generation - no build project

ITE Land Use Code	ITE Land Use Description	Peak Hour	Size (X)	Unit	Average Rate	Entering %	Exiting %	Estimated Trips	Entering	Exiting
310	Hotel	AM	88	Rooms	0.53	59%	41%	47	28	19
		PM	88	Rooms	0.6	51%	49%	53	27	26

ITE Trip Generation Manual, 9th Edition

Trip Generation

Code	Use	Peak Hour	Size (X)	Unit	Average Rate	Curve Equation	Entering %	Exiting %	Estimated Trips	Entering	Exiting
230	TH/Condos	AM*	57	Units	0.44	ln(T)=0.80*LN(X)+0.26	17%	83%	33	6	27
		PM*	57	units	0.52	ln(T)=0.82*LN(X)+0.32	67%	33%	38	25	13
931	Quality Restaurant	AM*	7500	SF	0.81	-	-	-	6	6	
		PM*	7500	SF	7.49	-	67%	33%	56	38	18
826	Specialty Retail Center	AM**	2500	SF							
		PM*	2500	SF	5.02	T=2.4(X)+21.48	44%	56%	27	12	15

ITE Trip Generation Manual, 9th Edition
*Peak Hour of Adjacent Street Traffic
** It is assumed that business hours of specialty retail establishments begin after typical AM peak periods

On-site parking:

- 59 spaces on level accessible from Elmwood for residential use only
- 92 spaces on level accessible from Forest: 55 for residential, 37 for commercial

Therefore:

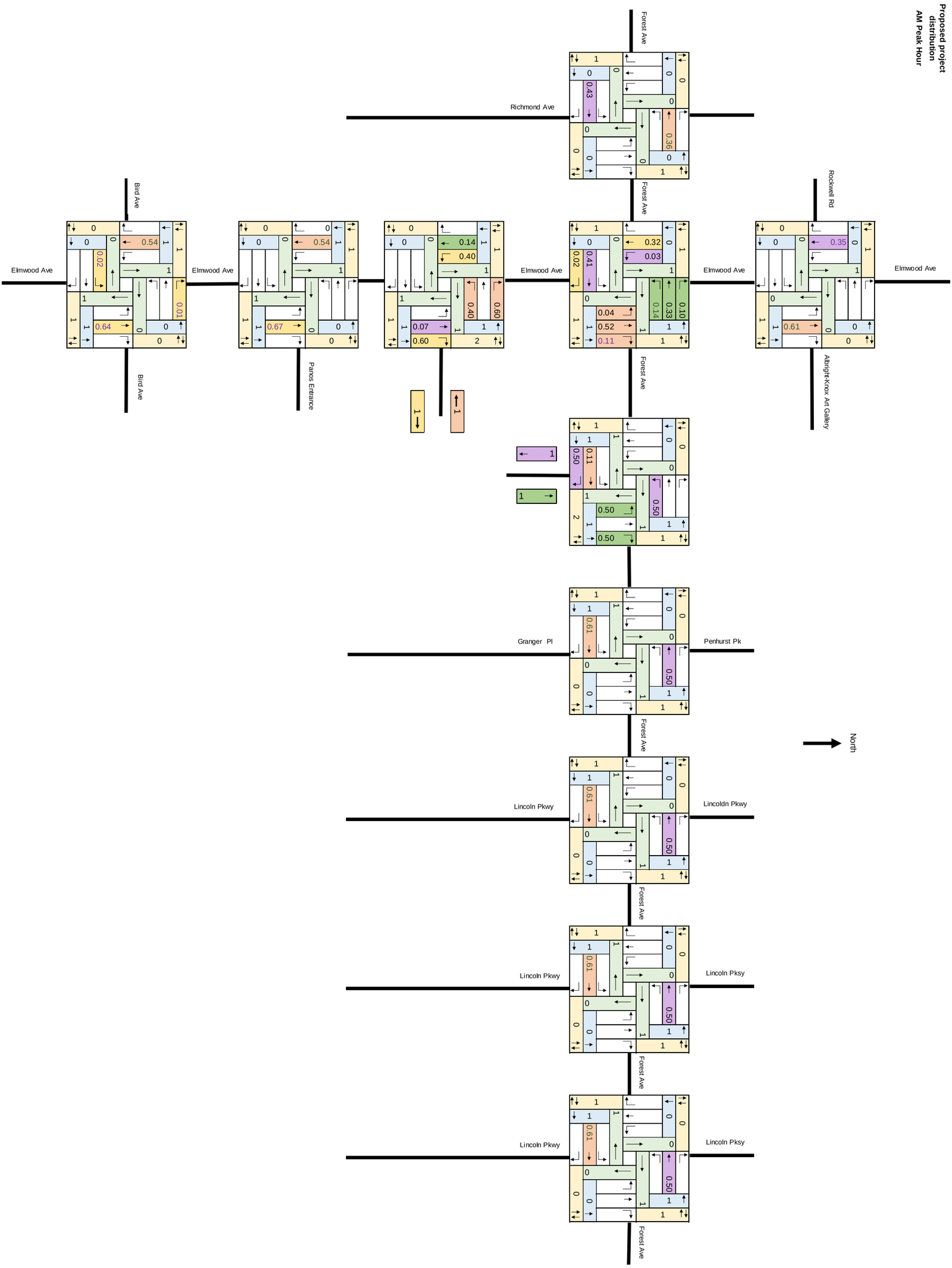
- All commercial trips to and from Forest access
- Residential trips split 50/50 between Elmwood and Forest access

option 1

Code	Use	Peak Hour	Estimated Trips	Entering	Exiting
230	TH/Condos	AM*	33	6	27
		PM*	38	25	13
931	Quality Restaurant	AM*	6	6	0
		PM*	56	38	18
	Total Trips AM		39	12	27
	Total Trips PM		94	63	31

option 2

Code	Use	Peak Hour	Estimated Trips	Entering	Exiting
230	TH/Condos	AM*	33	6	27
		PM*	38	25	13
826*	Specialty Retail	AM**	0	0	0
		PM*	81	36	45
*Three 2500 SF specialty retailers					
	Total Trips AM		33	6	27
	Total Trips PM		119	61	58



AFFINITY ELMWOOD GATEWAY PROPERTIES

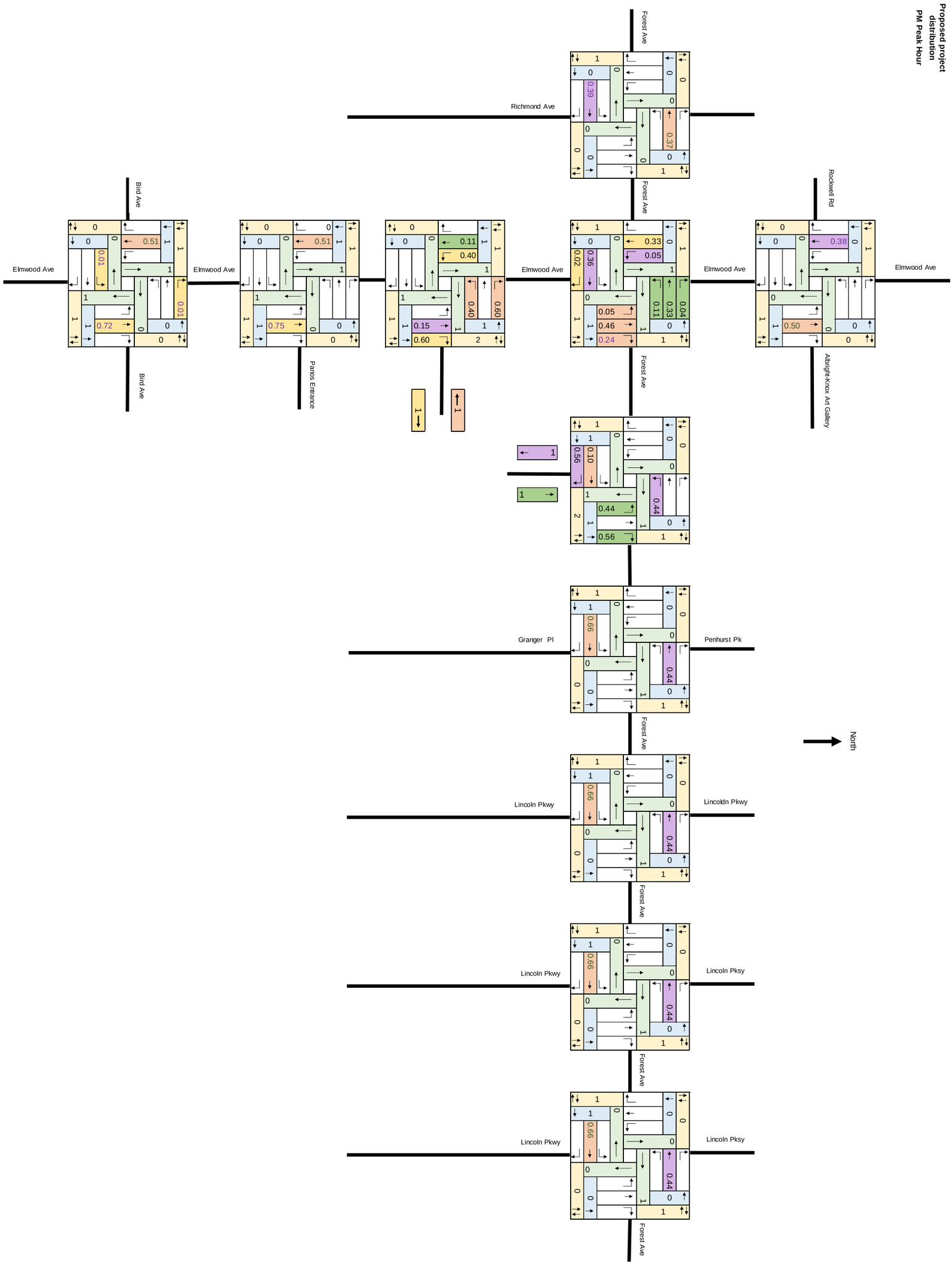
TRAFFIC IMPACT STUDY

TRIP DISTRIBUTION –

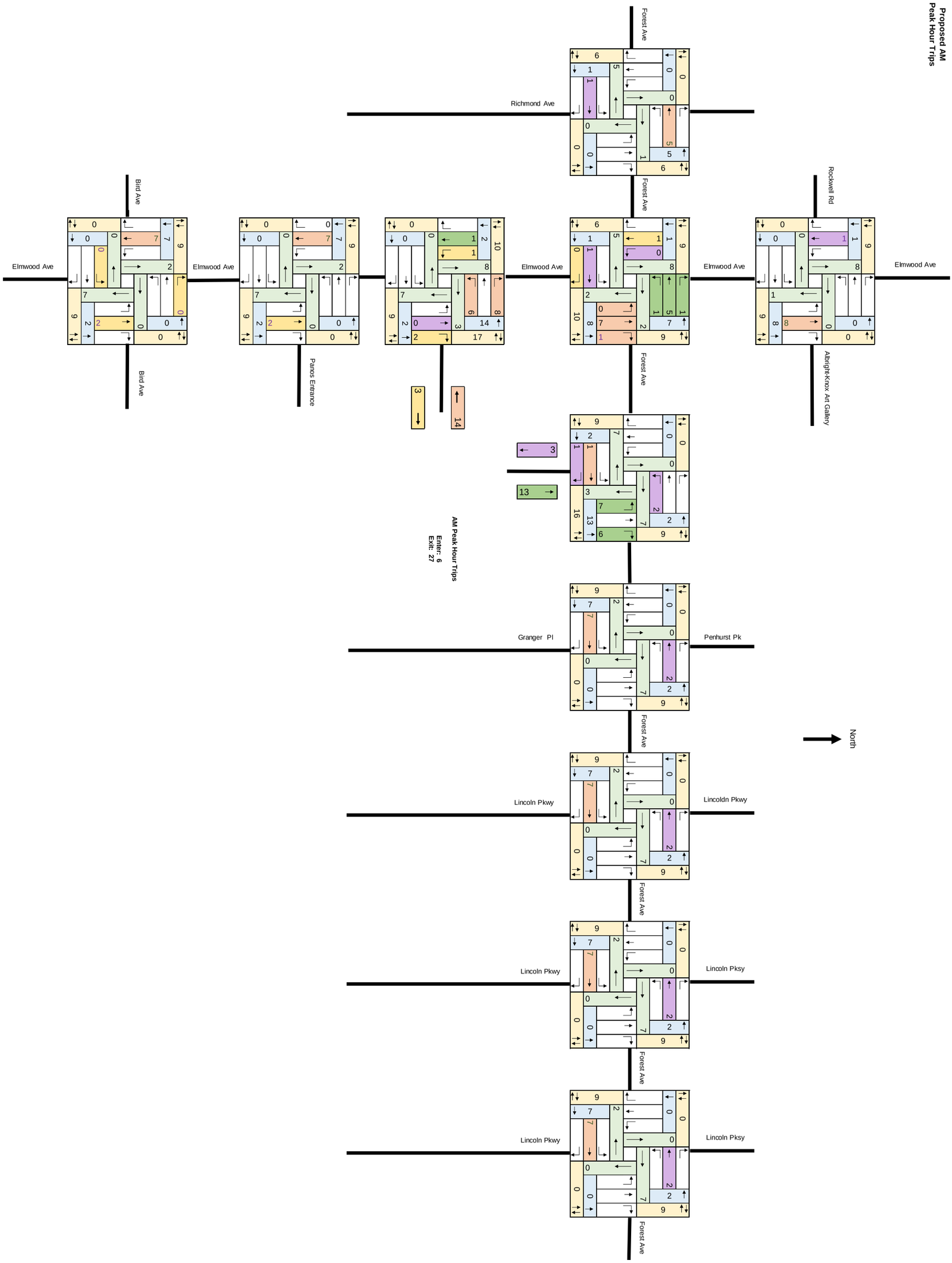
AM PEAK HOUR

NOT TO SCALE

FIGURE



AFFINITY ELMWOOD GATEWAY PROPERTIES **TRAFFIC IMPACT STUDY**	TRIP DISTRIBUTION – PM PEAK HOUR	NOT TO SCALE	FIGURE



AFFINITY ELMWOOD GATEWAY PROPERTIES

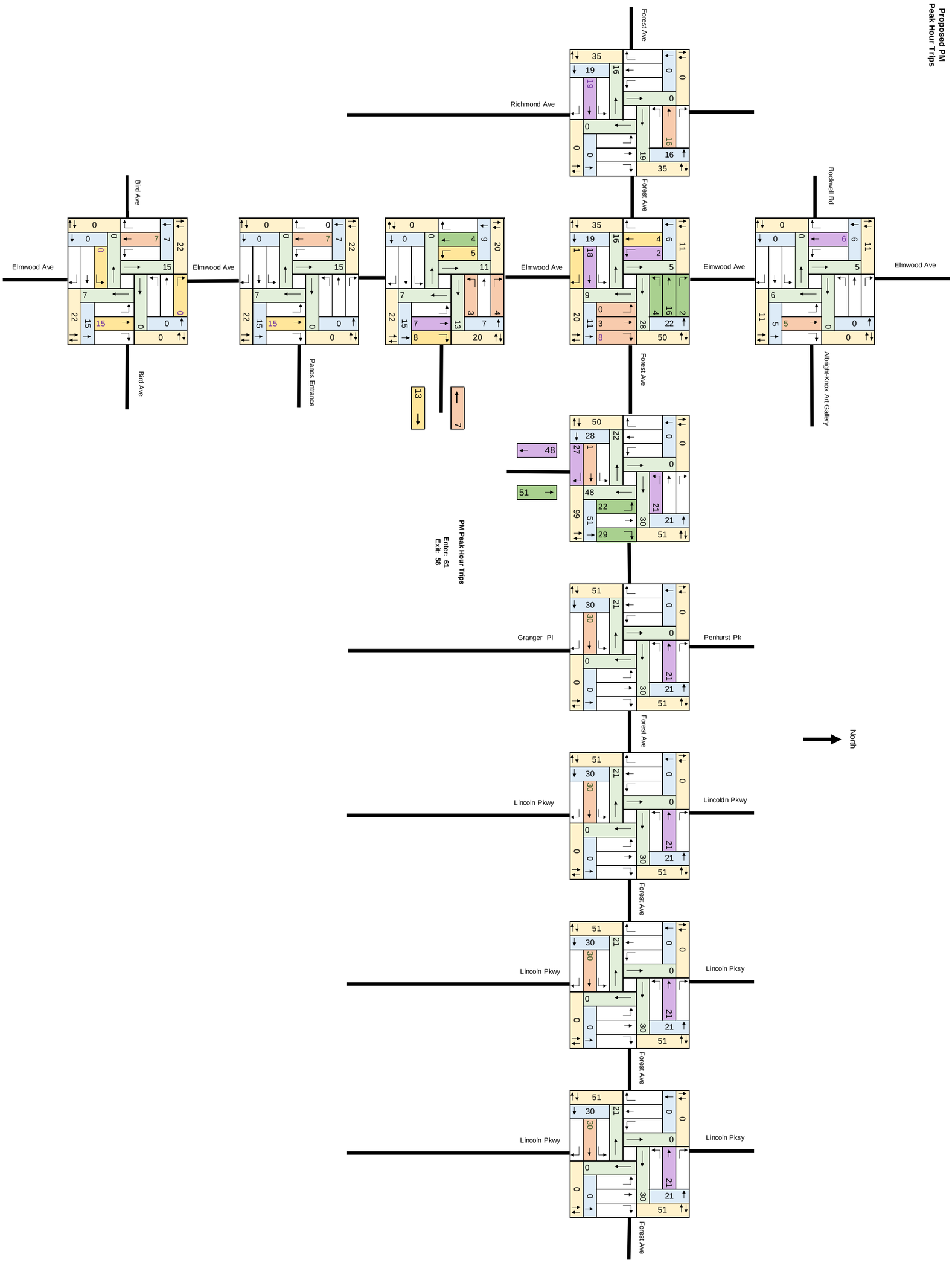
TRAFFIC IMPACT STUDY

PROPOSED TRIPS –

AM PEAK HOUR

NOT TO SCALE

FIGURE



AFFINITY ELMWOOD GATEWAY PROPERTIES

TRAFFIC IMPACT STUDY

PROPOSED TRIPS –

PM PEAK HOUR

NOT TO SCALE

FIGURE