

Traffic Report

Masterplan Traffic Impact and Access Study

Laconia Village
Parade Road and Meredith Center Road
Laconia, New Hampshire

TFM Project #96126.01

September 19, 2025
December 17, 2025 Rev1

Prepared for:
Pillsbury Realty Development, LLC

Submitted to:
**City of Laconia
NHDOT District 3**

Prepared by:



Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

48 Constitution Drive, Bedford, NH 03110
(603) 472-4488 www.tfmoran.com



TABLE OF CONTENTS

❖ Full Build Intersection Analysis – Masterplan

Project Introduction

❖ Part A (Updated Rev1)

Full Build Front Door Intersection Analysis

❖ Part B (Updated Rev1)

Full Build City Intersection Analysis

❖ Part C (No Change Rev1)

Full Build State Intersection Analysis

❖ Part D (No Change Rev1)

Traffic Memo – Full Build Trip Generation and Distribution

ATTACHMENTS

Part A – Front Door Backup Data (Updated Rev1)

Attachment A – Attachment J

Part B – City Backup Data (Updated Rev1)

Attachment A – Attachment P

Part C- State Backup Data (No Change Rev1)

Attachment A – Attachment O

Part D – Trip Generation and Distribution Backup Data (No Change Rev1)

Attachment A – Attachment J



Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

Full-Build Intersection Analysis – Masterplan

Date: 19 September 2025
17 December 2025 Rev1

To: City of Laconia

From: Bob Duval, PE
Jen Porter, PE

Project: Laconia Village - Parade Road & Meredith Center Road, Laconia NH
TFM# 96126.01

Subject: **Masterplan Traffic Study**

Introduction

This Memo describes recommended traffic mitigation measures for the approved Laconia Village Masterplan by Pillsbury Development Realty, LLC (Developer). The Masterplan proposes a mixed-use development at the former State School on Right Way Path in Laconia.

Trip Generation and Distribution have been previously reviewed and approved by the City and NHDOT and is included as Part D of this report.

The traffic analysis study area is 23 intersections including two proposed intersections at the project site. The study area is divided into three Parts for convenience: The intersections in each part are located as follows:

Part A - “Front Door” intersections adjacent to Laconia Village (See Part A Memo)

3. Parade Rd at Right Way Path/Old North Main St
2. Parade Rd at Meredith Center Rd/Elm St
32. Meredith Center Rd at Connector Rd
4. Meredith Center Rd at Eastman Rd/Lane Rd
31. Eastman Rd at Right Way Path

Part B - “City intersections” under City jurisdiction (See Part B Memo)

14. North Main St at Lexington Dr
15. North Main St at Oak St
19. North Main St at New Salem St
16. North Main St at Church St
17. North Main St at Union Ave/Court St
20. Court St at Fair St
13. Union Ave at Elm St/Clinton St
18. Union Ave at Gilford Ave
21. Union Ave at Church St/Winter St/Davis Pl

Part C - “State intersections” under direct NHDOT control (See Part C Memo)

5. NH104 at Meredith Center Rd
 1. Parade Rd (NH106) at Lane Rd/Severance Rd
 9. Parade Rd (NH106) at Roller Coaster Rd
 8. US3 at Parade Rd (NH106)/Upper Mile [Roundabout]
- 6&7. NH104 at US3 [2 Signals]
10. US3 at Roller Coaster Rd
11. US3 at Endicott St. [Roundabout]
12. US3 at US3 Bus/Blaisdell Ave

Project Overview

This full build analysis is based on complete build-out of the approved Masterplan, assumed to take place by year 2037. It is not expected that the full build mitigation recommendations will need to be in place for opening year, as this project is proposed in at least three major phases. Individual site plans will be prepared for each phase. At that point a new Traffic Study will be prepared for each Site Plan application, and those studies will be responsible for evaluating the required mitigation based on the individual and cumulative traffic impacts of that particular phase.

The full build Masterplan includes the following building elements:

- 125 Room Hotel
- 75,000 sf Recreation (YMCA or similar)
- 100,000 sf Office (General & Medical)
- 2,050 units Residential (Multifamily, Independent Elderly, Townhouse, Single Family)
- 120,000 sf Retail (In-Line)
- 75,000 sf Civic (Library, Town Offices)

Please refer to Masterplan phasing map on the following page:

Conceptual Phasing Plan – Laconia Village

Laconia: Detailed Master Plan

Implementation

A Phasing Strategy Based on Three Neighborhoods



LACONIA VILLAGE MASTERPLAN

Scope of Study

The following summary of Traffic Study parameters is pertinent to this memo:

Analysis Periods:

- *Weekday peak hours: AM (7am - 9am) and PM (3pm – 6pm)*
- *Weekend peak hours: SAT (11am – 1pm) midday peak hours*

Background growth: 1% annual minimum

Seasonal Adjustment: NHDOT Group 5, March 2023 data = 56%, June 2023 data = 5%

Opening Year/Future Year: 2027/2037

Other Developments: none

Internal Trip Capture: 7% AM, 24% PM & SAT

Signal Timing Source Signal timings for State intersections provided by NHDOT
Signal timings for City intersections provided by Laconia DPW

Part A (Updated Rev1)

Front Door

Full-Build Front Door Intersection Analysis – Part A

Introduction

This section focuses on Part A intersections located at the “Front Door” directly abutting the project site, listed below.



Part A Study Area

3. Parade Rd at Right Way Path/Old North Main St	page 3 to 8
2. Parade Rd at Meredith Center Rd/Elm St.....	page 9 to 14
32. Meredith Center Rd at Connector Rd	page 15 to 19
4. Meredith Center Rd at Eastman Rd/Lane Rd	page 20 to 24
31. Eastman Rd at Right Way Path	page 25 to 28

Intersection Summaries

For each study area intersection, a map, brief description, and 2037 peak hour volume diagrams are provided below, followed by a summary of operational results and discussion of proposed mitigation strategies.

Methodology.

Trafficware “Synchro” v11 software (based on HCM 2000) was used to analyze signalized and unsignalized intersections during AM, PM and SAT peak hours. Roundabouts were analyzed using SIDRA INTERSECTION 10.

Level of Service (LOS)

The relationship between control delay and LOS is shown in the following table.

Level of Service (LOS)	A	B	C	D	E	F
Signalized Control Delay (sec)	≤10.0	10.1 to 20.0	20.1 to 35.0	35.1 to 55.0	55.1 to 80.0	Over 80.0
Unsignalized Control Delay (sec)	≤10.0	10.1 to 15.0	15.1 to 25.0	25.1 to 35.0	35.1 to 50.0	Over 50.0

Queue Analysis.

Vehicle queue lengths are reported for each intersection movement at the 95th percentile in feet.

Volume to Capacity (v/c) ratios

The ratios of traffic volume for each movement within an intersection and the theoretical capacity of that movement are reported as a decimal. Also reported is the overall v/c ratio for the intersection.

Summary Tables

LOS, delays, queues, and v/c ratios are presented for each intersection overall and for each approach within each intersection in the summary tables in the following section.

Intersection #3 Parade Road/Right Way Path/Old N. Main Street

Existing Conditions

This is an existing 4-way, stop controlled intersection under State jurisdiction.

Parade Road (NH106) forms the NB and SB approaches, Right Way Path (site access) is the EB approach and Old North Main Street forms the WB approach.

Each approach carries two-way traffic on single lanes. Parade Road (NH106) has free flow; Right Way Path and Old North Main Street have stop control.

The posted speed limit is 40 mph through the intersection. There is a single cobra-head streetlight at the northeast corner of the intersection. There are no pedestrian facilities.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

No crashes were reported during this period for this intersection.

AM Total Site Trips

Parade Road			Old Main Street		
190	-7	0	0	17	0
←	↓	→	←	↓	→
Right Way Path			Parade Road		
180	↑		272	↑	→
7	→		-7		0
395	↓				
(NH106)			(NH106)		

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

Parade Road			Old Main Street		
5	-7	0	0	0	0
7	0	0	17	0	0
35	0	0	0	0	0
143	0	0	0	0	0
←	↓	→	←	↓	→
Right Way Path			Parade Road		
3	5	112	60	↑	
		0	7	→	
7	5	319	64	↓	
(NH106)			(NH106)		

PM Total Site Trips

Parade Road			Old Main Street		
203	-28	0	0	11	0
←	↓	→	←	↓	→
Right Way Path			Parade Road		
236	↑		479	↑	→
16	→		-51		0
451	↓				
(NH106)			(NH106)		

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

Parade Road			Old Main Street		
19	-28	0	0	0	0
27	0	0	11	0	0
84	0	0	0	0	0
73	0	0	0	0	0
←	↓	→	←	↓	→
Right Way Path			Parade Road		
18	54	53	111	↑	
		0	16	→	
54	34	152	211	↓	
(NH106)			(NH106)		

SAT Total Site Trips

Parade Road			Old Main Street		
222	-30	0	0	14	0
←	↓	→	←	↓	→
Right Way Path			Parade Road		
220	↑		317	↑	→
13	→		-37		0
299	↓				
(NH106)			(NH106)		

SAT Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

Parade Road			Old Main Street		
15	-30	0	0	0	0
30	0	0	14	0	0
74	0	0	0	0	0
103	0	0	0	0	0
←	↓	→	←	↓	→
Right Way Path			Parade Road		
16	37	72	95	↑	
		0	13	→	
30	30	108	131	↓	
(NH106)			(NH106)		

AM 2037 No-Build Volumes

0 758 3 ← ↓ →			Parade Road	↑ ← ↓ 28 0 3	Old Main Street
Right Way Path 1 1 6 ↑ → ↓			(NH106) Parade Road	← ↑ → 9 592 2	

AM 2037 Full Build Volumes

190 751 3 ← ↓ →			Parade Road	↑ ← ↓ 28 17 3	Old Main Street
Right Way Path 181 8 401 ↑ → ↓			(NH106) Parade Road	← ↑ → 281 585 2	

PM 2037 No-Build Volumes

0 687 26 ← ↓ →			Parade Road	↑ ← ↓ 14 0 9	Old Main Street
Right Way Path 4 3 10 ↑ → ↓			(NH106) Parade Road	← ↑ → 7 928 5	

PM 2037 Full Build Volumes

203 659 26 ← ↓ →			Parade Road	↑ ← ↓ 14 11 9	Old Main Street
Right Way Path 240 19 461 ↑ → ↓			(NH106) Parade Road	← ↑ → 486 877 5	

SAT 2037 No-Build Volumes

0 436 14 ← ↓ →			Parade Road	↑ ← ↓ 14 1 2	Old Main Street
Right Way Path 0 1 3 ↑ → ↓			(NH106) Parade Road	← ↑ → 3 459 9	

SAT 2037 Full Build Volumes

222 406 14 ← ↓ →			Parade Road	↑ ← ↓ 14 15 2	Old Main Street
Right Way Path 220 14 302 ↑ → ↓			(NH106) Parade Road	← ↑ → 320 422 9	

Summary of Operating Conditions

Intersection #3: Parade Road at Right Way Path/Old North Main Street

	<u>2037 No-Build</u>				<u>2037 Build</u>				<u>2037 Build</u> <u>Mitigation: 2-lane Roundabout</u>			
Movement	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
3: Parade Road (NH106) at Right Way Path/Old Main St [Unsignalized]												
AM Peak OVERALL	---	0.7	A	---	---	>300	F	---	0.59	10.9	B	---
EB All	0.04	21.6	C	3	Err	>300	F	>500	0.59	17.9	C	86
WB All	0.10	16.7	C	8	Err	>300	F	>500	0.17	10.4	B	14
NB All	0.01	0.3	A	1	0.48	13.2	B	65	0.47	8.6	A	68
[NWB All]	-	-	-	-	-	-	-	-	0.03	10.6	B	3
SB All	0.00	0.1	A	0	0.00	0.1	A	0	0.47	8.8	A	75
PM Peak OVERALL	---	0.7	A	---	---	>300	F	---	0.75	15.7	C	---
EB All	0.15	40.1	E	13	Err	>300	F	>500	0.66	19.5	C	116
WB All	0.26	52.1	F	23	Err	>300	F	>500	0.14	16.2	C	10
NB All	0.01	0.3	A	1	0.73	22.2	C	164	0.75	16.9	C	320
[NWB All]	-	-	-	-	-	-	-	-	0.17	14.0	B	12
SB All	0.04	1.2	A	3	0.04	1.2	A	3	0.52	11.0	B	84
SAT Peak OVERALL	---	0.5	A	---	---	>300	F	---	0.42	7.7	A	---
EB All	0.01	13.5	B	1	9.25	>300	F	>500	0.36	8.4	A	41
WB All	0.04	13.4	B	3	0.71	179.0	F	71	0.08	8.1	A	6
NB All	0.00	0.1	A	0	0.39	8.4	A	46	0.42	8.1	A	54
[NWB All]	-	-	-	-	-	-	-	-	0.11	8.1	A	9
SB All	0.01	0.4	A	1	0.01	0.4	A	1	0.27	6.6	A	30

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d 95th percentile queue in feet

Intersection #3: Parade Road at Right Way Path / Old North Main Street	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	1403	1047	42.7%
PM Peak Hour	1693	1317	43.8%
SAT Peak Hour	942	1018	51.9%

Analysis

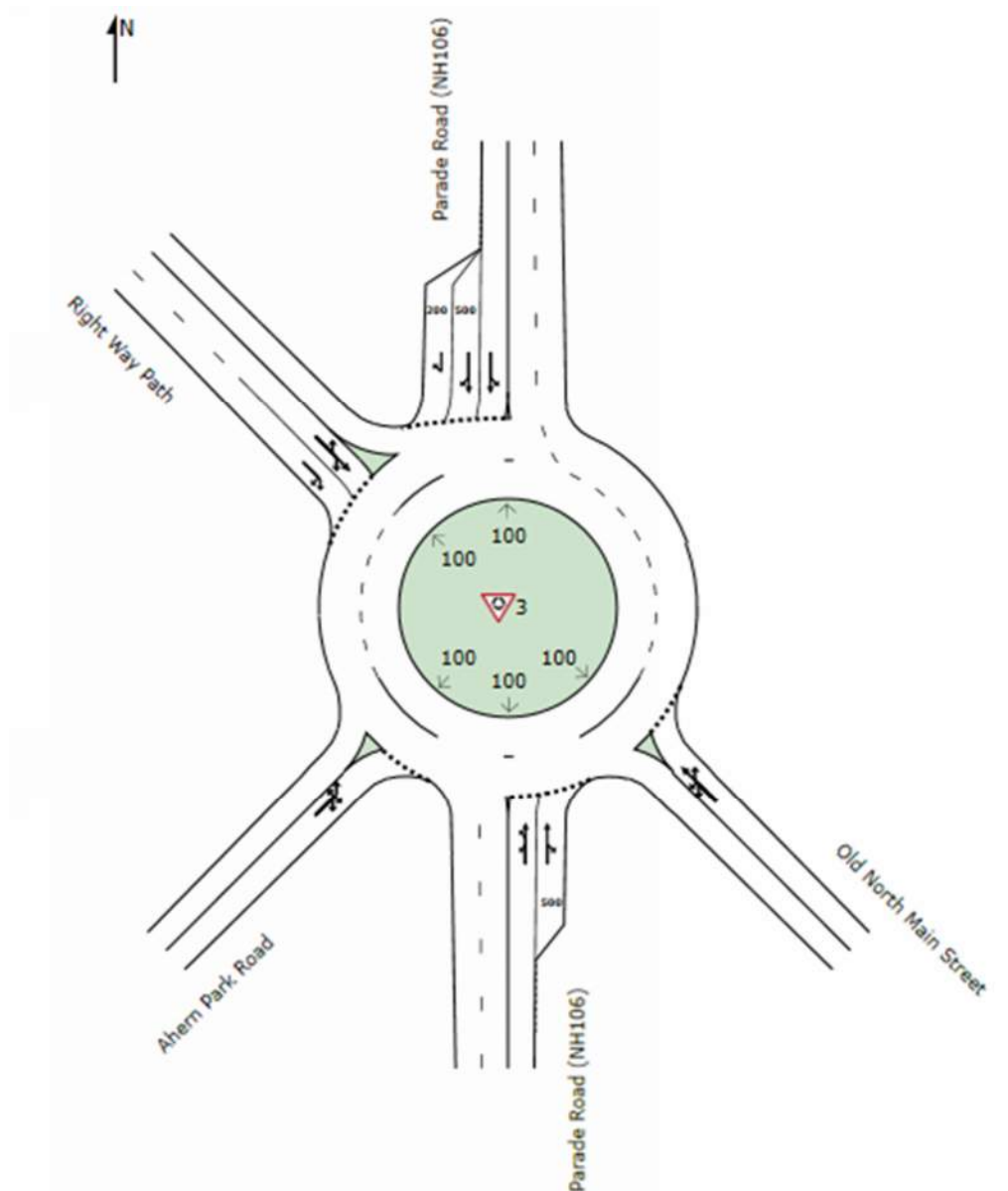
This intersection will be the main access point for the Laconia Village Development. Because of turning volumes, the need to accommodate Ahern Park Road near its current position, and to separate Ahern Park traffic (frequent RVs, campers, trailers, etc.) into the residential and commercial site roadways, we are proposing a roundabout for this intersection with Ahern Park Road as a 5th leg.

For Full Build conditions, the roundabout should contain two center circulation lanes around the entire roundabout. Northbound and southbound approaches should have two entering lanes and two exiting lanes.

Old North Main Street and Ahern State Park should have single lane approaches entering and exiting. Right Way Path should have two lanes entering the roundabout and a single lane exiting. There should be an exclusive southbound right lane to direct Laconia Village traffic into the site without entering the roundabout.

Recommended Mitigation

- Construct 5-leg roundabout with two circulating lanes.



Intersection #3 - Proposed 5-Leg, Two-Lane Roundabout at Parade Road/Right Way Path

Alternate Mitigation Option

The city asked for consideration of a one-lane roundabout at this location. SIDRA analysis provided in the appendix shows that a one-lane roundabout does not provide needed capacity for through traffic and site development traffic and results in LOS F during the AM and PM peak hours.

Intersection #2

Parade Road at Meredith Center Road/Elm Street

Existing Conditions

This is an existing 4-way signalized intersection under State jurisdiction.

Parade Road (NH106) forms the NB and SB approaches with Meredith Center Road forming the EB approach and Elm Street forming the WB approach. The EB and WB approaches both have two lanes; an exclusive right-turn lane and a left-thru lane. The NB approach has three lanes, an exclusive left-turn lane, a thru lane and an exclusive right-turn lane. The SB approach has an exclusive left-turn lane and thru-right lane.

The posted speed limit is 40 mph on Parade Road and Meredith Center Road. On Elm Street the posted speed limit is 30 mph. There are cobra-head street lights on top of the mast arms at the northeast and southwest corners of the intersection. There are no pedestrian facilities.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Considering the volume passing through this intersection, the crash history is favorable.

Crash Data Summary Intersection #2: Parade Road at Meredith Center Road and Elm Street

CRASH FREQUENCY	
Total Crashes	8
Crashes per Year (Avg)	2
CRASH SEVERITY	
Property Damage Only	5
Injury	3
Fatality	0
CRASH TYPE	
Fixed Object	0
Other Motor Vehicle	8
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	1
Snow/Ice	2
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	1
Non-Commuter Peak	7



AM Total Site Trips

			Parade Road			
71	106	0		↑ 0		
↶	↓	↷		← 55		
				↱ 75		
				Elm Street		
Meredith Center Rd			Parade Road	↶	↑	↷
	65	↶		0	85	91
	76	→				
	0	↱				

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

4	4		Parade Road			
12	14	0		↑ 0	0	
55	88	0		← 33	21	1
↶	↓	↷		↱ 55	19	1
				Elm Street		
Meredith Center Rd			Parade Road	↶	↑	↷
3	39	23		0	37	23
1	62	13				
	0	0		0	45	67
					3	1

PM Total Site Trips

			Parade Road			
81	88	0		↑ 0		
↶	↓	↷		← 84		
				↱ 88		
				Elm Street		
Meredith Center Rd			Parade Road	↶	↑	↷
	92	↶		0	95	87
	83	→				
	0	↱				

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

13	14		Parade Road			
28	34	0		↑ 0	0	
40	40	0		← 33	47	4
↶	↓	↷		↱ 33	50	5
				Elm Street		
Meredith Center Rd			Parade Road	↶	↑	↷
12	19	61		0	61	50
4	29	50				
	0	0		0	21	32
					13	5

SAT Total Site Trips

			Parade Road			
98	99	0		↑ 0		
↶	↓	↷		← 84		
				↱ 93		
				Elm Street		
Meredith Center Rd			Parade Road	↶	↑	↷
	93	↶		0	95	88
	79	→				
	0	↱				

SAT Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

10	10		Parade Road			
37	37	0		↑ 0	0	
51	52	0		← 46	34	4
↶	↓	↷		↱ 51	37	5
				Elm Street		
Meredith Center Rd			Parade Road	↶	↑	↷
10	36	47		0	48	47
4	32	43				
	0	0		0	36	36
					11	5

AM 2037 No-Build Volumes

		Parade Road	
5	439	163	
←	↓	↘	
		Elm Street	
		↑ 120	
		← 118	
		↘ 65	
Meredith Center Rd			
5	↑	←	↑
141	→	149	343
264	↘		91
		Parade Road	

AM 2037 Full Build Volumes

		Parade Road	
76	545	163	
←	↓	↘	
		Elm Street	
		↑ 120	
		← 173	
		↘ 140	
Meredith Center Rd			
70	↑	←	↑
217	→	149	428
264	↘		182
		Parade Road	

PM 2037 No-Build Volumes

		Parade Road	
3	420	163	
←	↓	↘	
		Elm Street	
		↑ 165	
		← 144	
		↘ 114	
Meredith Center Rd			
2	↑	←	↑
167	→	241	499
179	↘		204
		Parade Road	

PM 2037 Full Build Volumes

		Parade Road	
84	508	163	
←	↓	↘	
		Elm Street	
		↑ 165	
		← 228	
		↘ 202	
Meredith Center Rd			
94	↑	←	↑
250	→	241	594
179	↘		291
		Parade Road	

SAT 2037 No-Build Volumes

		Parade Road	
2	271	120	
←	↓	↘	
		Elm Street	
		↑ 135	
		← 116	
		↘ 46	
Meredith Center Rd			
2	↑	←	↑
109	→	111	299
116	↘		63
		Parade Road	

SAT 2037 Full Build Volumes

		Parade Road	
100	370	120	
←	↓	↘	
		Elm Street	
		↑ 135	
		← 200	
		↘ 139	
Meredith Center Rd			
95	↑	←	↑
188	→	111	394
116	↘		151
		Parade Road	

Summary of Operating Conditions

Intersection #2: Parade Road at Meredith Center Road and Elm Street

	2037 No-Build				2037 Build				2037 Build Mitigation: Signal			
Movement	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
2: Parade Road (NH106) at Meredith Center Rd/Elm St [Signalized]												
AM Peak OVERALL	0.61	21.8	C	---	0.98	53.4	D	---	0.80	40.1	D	---
[EB L]	-	-	-	-	-	-	-	-	0.43	47.3	D	108
EB LT [T]	0.36	22.2	C	129	0.75	33.5	C	321	0.71	48.8	D	274
EB R	0.19	21.0	C	58	0.19	21.2	C	57	0.34	24.3	C	148
[WB L]	-	-	-	-	-	-	-	-	0.62	48.0	D	186
WB LT [T]	0.54	24.5	C	165	1.09	105.9	F	432	0.79	50.4	D	353
WB R	0.09	20.3	C	41	0.13	20.7	C	56	-	-	-	-
NB L	0.47	25.3	C	145	0.56	37.3	D	153	0.61	46.4	D	191
NB T	0.58	19.3	B	281	0.77	32.9	C	434	0.69	30.7	C	420
NB R	0.07	14.6	B	33	0.18	21.3	C	69	0.13	12.8	B	37
SB L	0.48	25.0	C	154	0.58	37.4	D	165	0.76	58.8	E	260
SB TR [T]	0.72	22.5	C	376	1.08	87.6	F	>500	0.90	48.1	D	688
[SB R]	-	-	-	-	-	-	-	-	0.05	15.9	B	6
PM Peak OVERALL	0.77	27.9	C	---	1.30	144.7	F	---	0.97	47.2	D	---
[EB L]	-	-	-	-	-	-	-	-	0.66	49.7	D	132
EB LT [T]	0.34	23.2	C	145	1.69	>300	F	534	0.83	52.0	D	287
EB R	0.13	21.4	C	48	0.16	22.6	C	62	0.19	20.2	C	71
[WB L]	-	-	-	-	-	-	-	-	0.82	54.5	D	244
WB LT [T]	0.75	34.0	C	251	1.94	>300	F	661	0.96	65.7	E	416
WB R	0.18	21.9	C	68	0.22	23.1	C	90	-	-	-	-
NB L	0.67	34.1	C	241	0.73	43.1	D	241	0.85	55.1	E	281
NB T	0.80	30.0	C	526	0.96	53.0	D	675	0.96	51.9	D	585
NB R	0.22	18.3	B	89	0.35	22.3	C	143	0.28	12.2	B	89
SB L	0.52	31.9	C	155	0.56	38.7	D	155	0.79	56.5	E	201
SB TR [T]	0.72	28.3	C	357	1.01	70.9	E	629	0.92	49.5	D	483
[SB R]	-	-	-	-	-	-	-	-	0.05	16.5	B	18
SAT Peak OVERALL	0.46	16.5	B	---	0.83	36.0	D	---	0.70	33.8	C	---
[EB L]	-	-	-	-	-	-	-	-	0.50	42.1	D	138
EB LT [T]	0.26	16.4	B	91	0.82	37.6	D	342	0.52	34.6	C	231
EB R	0.08	15.4	B	39	0.08	18.0	B	38	0.08	20.2	C	12
[WB L]	-	-	-	-	-	-	-	-	0.55	40.2	D	179
WB LT [T]	0.41	17.5	B	130	0.97	63.6	E	427	0.78	41.9	D	420
WB R	0.09	15.5	B	42	0.15	18.5	B	64	-	-	-	-
NB L	0.39	21.0	C	101	0.45	34.8	C	118	0.47	39.6	D	146
NB T	0.53	15.7	B	207	0.70	28.9	C	338	0.73	34.2	C	372
NB R	0.04	12.4	B	15	0.13	20.4	C	53	0.10	14.0	B	60
SB L	0.42	21.1	C	106	0.47	34.6	C	125	0.55	42.0	D	165
SB TR [T]	0.48	15.0	B	185	0.84	36.2	D	453	0.71	34.0	C	374
[SB R]	-	-	-	-	-	-	-	-	0.06	16.3	B	0

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d 95th percentile queue in feet

<i>Intersection #2: Parade Road at Meredith Center Road and Elm Street</i>	<i>Total Background Volume</i>	<i>Added Site Trips</i>	<i>% Added to Intersection</i>
AM Peak Hour	1903	624	24.7%
PM Peak Hour	2301	698	23.3%
SAT Peak Hour	1390	729	34.4

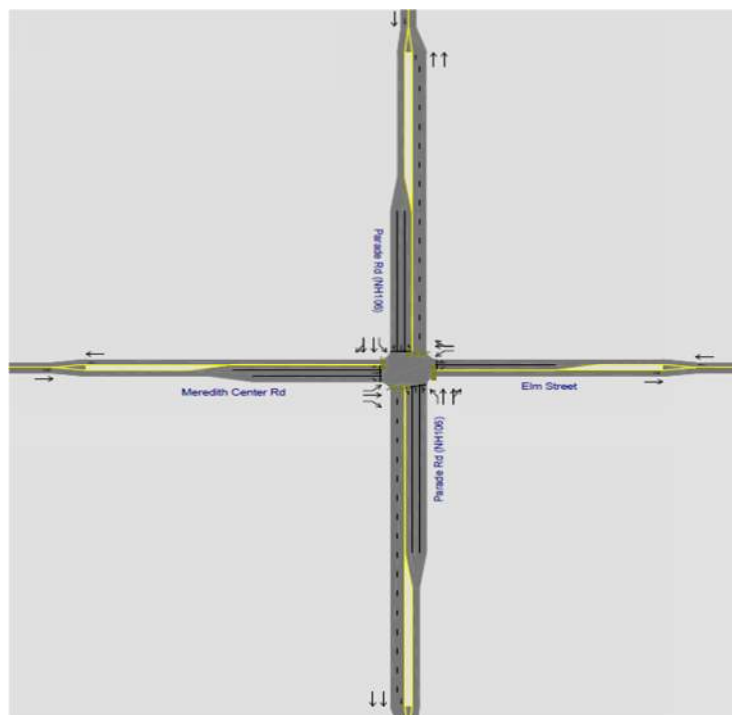
Analysis

This intersection will experience site trips in all four directions as each roadway leads to a direct access point of Laconia Village: the Right Way Path entrance to the south on Parade Road, and the new Connector Road entrance to the west up Meredith Center Road.

In full build conditions, turn volumes are heavy, and are not effectively mitigated with signal timing adjustments only. Additional lanes are needed along with timing adjustments at the following approaches:

Recommended Mitigation

- Eastbound: add turn lane EBL to existing EBT, EBR
- Westbound: new lane assignment – WBL, WBT/R.
- Northbound: new lane assignment – NBL, NBT, NBT/R; two exiting lanes
- Southbound: add lane – SBL, SBT, SBT/R; two exiting lanes



Intersection #2 - Proposed New Lanes, Parade Rd at Meredith Center Rd/Elm St

Alternate Mitigation Option

The city asked for consideration of a roundabout at this location. SIDRA analysis provided in the appendix shows both a one-lane roundabout and a hybrid 2-lane roundabout at this intersection. The one-lane roundabout does not provide needed capacity for through traffic in PM peak hour and nearing capacity during the AM. If a roundabout is selected, we would recommend the 2-lane capacity for NB and SB approaches.

Intersection #32: Meredith Center Road at Connector Road

Existing Conditions

This is a proposed new stop-controlled T intersection that will serve as a secondary entrance into the middle of the development from Meredith Center Road, approximately halfway between Parade Road and Eastman Road.

Meredith Center Road forms the free-running EB and WB approaches, and Connector Road will form the NB, stop-controlled approach to Meredith Center Road.

The posted speed is 40 mph on Meredith Center Road. The Village speed limit will be 25 mph. There is no lighting along the connector roadway and no pedestrian facilities. There is no streetlighting on Meredith Center Road, and no pedestrian facilities.



AM Total Site Trips

		← -4	
		↓ 129	
Meredith Center Rd			
		←	→
-3 →	Connector Rd	48	142
71 ↓			

AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

		← 0	0	-4	
		↓ 88	32	4	5
Meredith Center Rd					
		←	→		
-3 →	Connector Rd	26	36		3
71 ↓		17	101		1
		3	2		
		2	3		

PM Total Site Trips

		← -28	
		↓ 193	
Meredith Center Rd			
		←	→
-10 →	Connector Rd	86	185
60 ↓			

PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

		← 0	0	-28	
		↓ 72	75	28	18
Meredith Center Rd					
		←	→		
-10 →	Connector Rd	44	110		
60 ↓		8	48		
		24	11		
		10	16		

SAT Total Site Trips

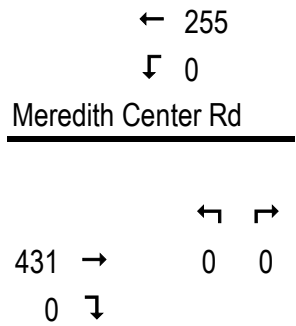
		← -24	
		↓ 207	
Meredith Center Rd			
		←	→
-11 →	Connector Rd	104	183
97 ↓			

SAT Site Composition Trips

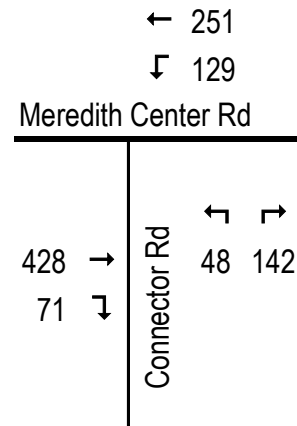
Primary, *Pass-by*, *Diverted Link*, *Residential*

		← 0	0	-24	
		↓ 98	71	24	14
Meredith Center Rd					
		←	→		
-11 →	Connector Rd	43	90		10
97 ↓		32	68		4
		23	11		
		6	14		

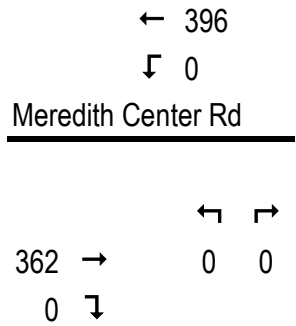
AM 2037 No-Build Volumes



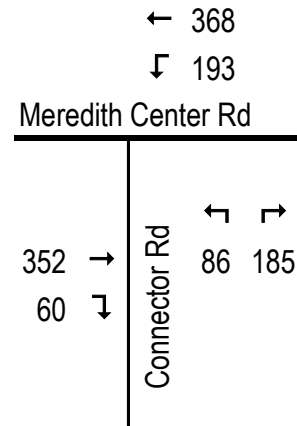
AM 2037 Full Build Volumes



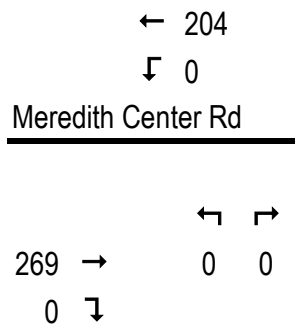
PM 2037 No-Build Volumes



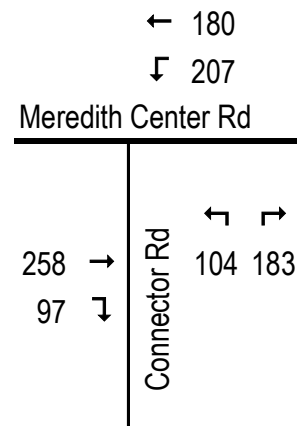
PM 2037 Full Build Volumes



SAT 2037 No-Build Volumes



SAT 2037 Full Build Volumes



Summary of Operating Conditions

Intersection #32: Meredith Center Road at Connector Road

	2037 No-Build				2037 Build				2037 Build Mitigation: NBL + EB 2-lane			
Movement	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
32: Meredith Center Rd at Connector Road [Unsignalized]												
AM Peak OVERALL	---	-	-	---	---	5.8	A	---	---	4.2	A	---
EB All	-	-	-	-	0.33	0.0	A	0	0.33	0.0	A	0
[WB L]	-	-	-	-	-	-	-	-	0.14	9.1	A	12
WB [T]	-	-	-	-	0.14	4.1	A	12	0.16	0.0	A	0
NB [L]	-	-	-	-	0.54	24.4	C	77	0.28	17.5	C	29
PM Peak OVERALL	---	-	-	---	---	19.2	C	---	---	7.8	A	---
EB All	-	-	-	-	0.27	0.0	A	0	0.27	0.0	A	0
[WB L]	-	-	-	-	-	-	-	-	0.19	9.0	A	18
WB [T]	-	-	-	-	0.19	4.6	A	18	0.24	0.0	A	0
NB [L]	-	-	-	-	0.96	78.6	F	248	0.63	29.2	D	108
SAT Peak OVERALL	---	-	-	---	---	14.9	B	---	---	8.0	A	---
EB All	-	-	-	-	0.23	0.0	A	0	0.23	0.0	A	0
[WB L]	-	-	-	-	-	-	-	-	0.20	8.9	A	18
WB [T]	-	-	-	-	0.20	5.7	A	18	0.12	0.0	A	0
NB [L]	-	-	-	-	0.83	46.0	E	188	0.54	22.1	C	80

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d 95th percentile queue in feet

Intersection #32: Meredith Center Road at Connector Road	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	686	383	35.8%
PM Peak Hour	758	486	39.1%
SAT Peak Hour	476	556	53.7%

Analysis

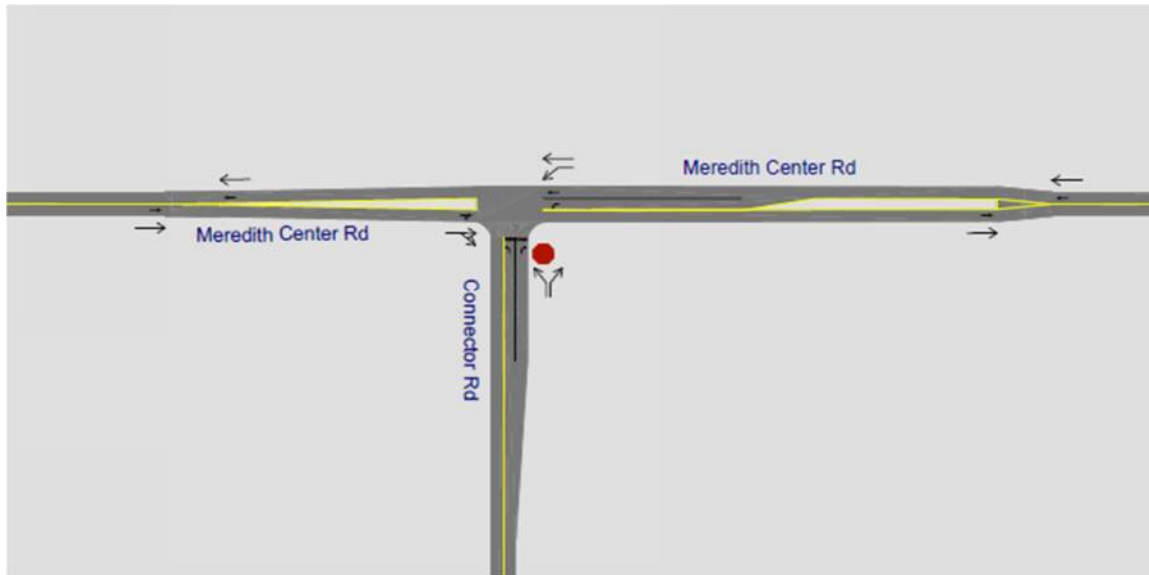
Under full-build conditions, the left turn volume into the site from Meredith Center Road meets warrants for an auxiliary turn lane. The exiting Connector Road does not meet warrants for the second lane on a minor road, however, without a separate exiting left turn lane, the movements are at capacity and delays are lengthy.

With turn lanes in place, the left turn operates at moderate LOS C/D, with 4 car queue or less and adequate reserve capacity in all peak hours.

We recommend the construction of a northbound left turn lane on Meredith Center Road, with a two-lane approach (separate left and right-turn lanes) on the new Connector Road.

Recommended Mitigation

- Construct northbound left turn lane on Meredith Center Road
- Construct two-lane approach (separate left and right-turn lanes) on Connector Road.



Intersection #32 - Meredith Center Road at Connector Road

Intersection #4: Meredith Center Road at Eastman Road / Lane Road

Existing Conditions

This is an existing stop-controlled intersection in the northwest corner of the site. Site trips using the western access point of the Village will pass through this intersection. Meredith Center Road forms the free-running EB and WB approaches, Eastman Road forming the NB approach, and Lane Road forming the SB approach. Each approach accommodates two way traffic with a single approach lane. Eastman Road and Lane Road have stop signs.

The posted speed limit is 40 mph on Meredith Center Road, 25 mph on Eastman Road, and 35 mph on Lane Road. There is a cobra-head streetlight at the north corner of the intersection. There are no pedestrian facilities. Approximately 180' to the south is the entrance to the Robbie Mills Sports Complex, and less than 100' to the south is the north terminus of Right Way Path.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. The crash history is favorable.

Crash Data Summary Intersection #4: Meredith Center Rd at Eastman Rd/Lane Rd

CRASH FREQUENCY	
Total Crashes	1
Crashes per Year (Avg)	0.25
CRASH SEVERITY	
Property Damage Only	1
Injury	0
Fatality	0
CRASH TYPE	
Fixed Object/Ditch	1
Other Motor Vehicle	0
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	1
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	0
Non-Commuter Peak	1



AM Total Site Trips

Lane Road			Meredith Center Rd		
0	27	0	0	44	0
←	↓	→	←	↓	→
Meredith Cntr Rd			Eastman Road		
0	↗		←	↑	↘
65	→		38	11	2
69	↘				

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

Lane Road			Meredith Center Rd		
0	0	0	0	0	0
0	27	0	←	26	17
←	↓	→	↓	0	0
Meredith Cntr Rd			Eastman Road		
0	0	0	←	↑	↘
0	↗		26	11	0
3	-3	5	60	→	0
2	3	4	60	↘	0
			1	0	2

PM Total Site Trips

Lane Road			Meredith Center Rd		
0	15	0	0	62	0
←	↓	→	←	↓	→
Meredith Cntr Rd			Eastman Road		
0	↗		←	↑	↘
41	→		54	22	9
51	↘				

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

Lane Road			Meredith Center Rd		
0	0	0	0	0	0
0	15	0	←	44	8
←	↓	→	↓	0	0
Meredith Cntr Rd			Eastman Road		
0	0	0	←	↑	↘
0	↗		39	22	0
8	-9	13	29	→	0
7	9	8	27	↘	0
			9	0	9

SAT Total Site Trips

Lane Road			Meredith Center Rd		
0	41	0	0	81	0
←	↓	→	←	↓	→
Meredith Cntr Rd			Eastman Road		
0	↗		←	↑	↘
76	→		85	38	0
89	↘				

SAT Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

Lane Road			Meredith Center Rd		
0	17	0	0	0	0
0	24	0	←	43	32
←	↓	→	↓	0	0
Meredith Cntr Rd			Eastman Road		
0	0	0	←	↑	↘
0	↗		39	22	0
7	-10	33	46	→	0
7	10	30	42	↘	0
			6	16	0

AM 2037 No-Build Volumes

9 2 0 ← ↓ →			Lane Road ↑ 0 ← 246 ↓ 5
			Meredith Center Rd
Meredith Cntr Rd 0 ↑ 422 → 0 ↓			Eastman Road ← ↑ → 0 0 5

AM 2037 Full Build Volumes

9 29 0 ← ↓ →			Lane Road ↑ 0 ← 290 ↓ 5
			Meredith Center Rd
Meredith Cntr Rd 0 ↑ 487 → 69 ↓			Eastman Road ← ↑ → 38 11 7

PM 2037 No-Build Volumes

0 0 0 ← ↓ →			Lane Road ↑ 0 ← 376 ↓ 11
			Meredith Center Rd
Meredith Cntr Rd 3 ↑ 345 → 1 ↓			Eastman Road ← ↑ → 0 1 10

PM 2037 Full Build Volumes

0 15 0 ← ↓ →			Lane Road ↑ 0 ← 438 ↓ 11
			Meredith Center Rd
Meredith Cntr Rd 3 ↑ 386 → 52 ↓			Eastman Road ← ↑ → 54 23 19

SAT 2037 No-Build Volumes

7 1 0 ← ↓ →			Lane Road ↑ 0 ← 186 ↓ 10
			Meredith Center Rd
Meredith Cntr Rd 9 ↑ 255 → 2 ↓			Eastman Road ← ↑ → 1 0 8

SAT 2037 Full Build Volumes

7 42 0 ← ↓ →			Lane Road ↑ 0 ← 267 ↓ 10
			Meredith Center Rd
Meredith Cntr Rd 9 ↑ 331 → 91 ↓			Eastman Road ← ↑ → 86 38 8

Summary of Operating Conditions

Intersection #4: Meredith Center Rd at Eastman Rd/Lane Rd

	2037 No-Build				2037 Build				2037 Build Mitigation: none			
Movement	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
4: Meredith Center Rd at Eastman Rd/Lane Rd [Unsignalized]												
AM Peak OVERALL	---	0.3	A	---	---	2.3	A	---	---			---
EB All	0.00	0.0	A	0	0.00	0.0	A	0	NO MIT			
WB All	0.01	0.2	A	0	0.01	0.2	A	0				
NB All	0.01	11.1	B	1	0.25	24.4	C	24				
SB All	0.02	10.8	B	1	0.14	18.6	C	12				
PM Peak OVERALL	---	0.4	A	---	---	3.3	A	---	---			---
EB All	0.00	0.1	A	0	0.00	0.1	A	0	NO MIT			
WB All	0.01	0.3	A	1	0.01	0.3	A	1				
NB All	0.02	11.1	B	2	0.42	29.1	D	49				
SB All	0.14	0.0	A	0	0.07	21.3	C	6				
SAT Peak OVERALL	---	6.2	A	---	---	15.9	C	---	---			---
EB All	0.00	0.0	A	0	0.00	0.0	A	0	NO MIT			
WB All	0.01	0.3	A	0	0.01	0.2	A	0				
NB All	0.36	14.3	B	41	0.69	29.4	D	129				
SB All	0.01	10.3	B	0	0.64	44.5	E	96				

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d 95th percentile queue in feet

Intersection #4: Meredith Center Rd at Eastman Rd/Lane Rd	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	689	256	27.1%
PM Peak Hour	747	254	25.4%
SAT Peak Hour	479	410	46.1%

Analysis

This intersection accommodates thru traffic on Meredith Center Road from the Connector Road access point, as well as site trips using the Eastman Road access point. Since the Eastman Road access point has relatively low volume, there are fewer turns than at other “front door” intersections.

Since most site trips are thru movements and right turns, at full build there are no major issues at this intersection. Left turns from the side roads experience moderate delay (LOS D/E) in the PM and Sat peak hours; and queues are reasonable at 4 cars PM and 5 cars Sat, with adequate reserve capacity in each case.

Recommended Mitigation

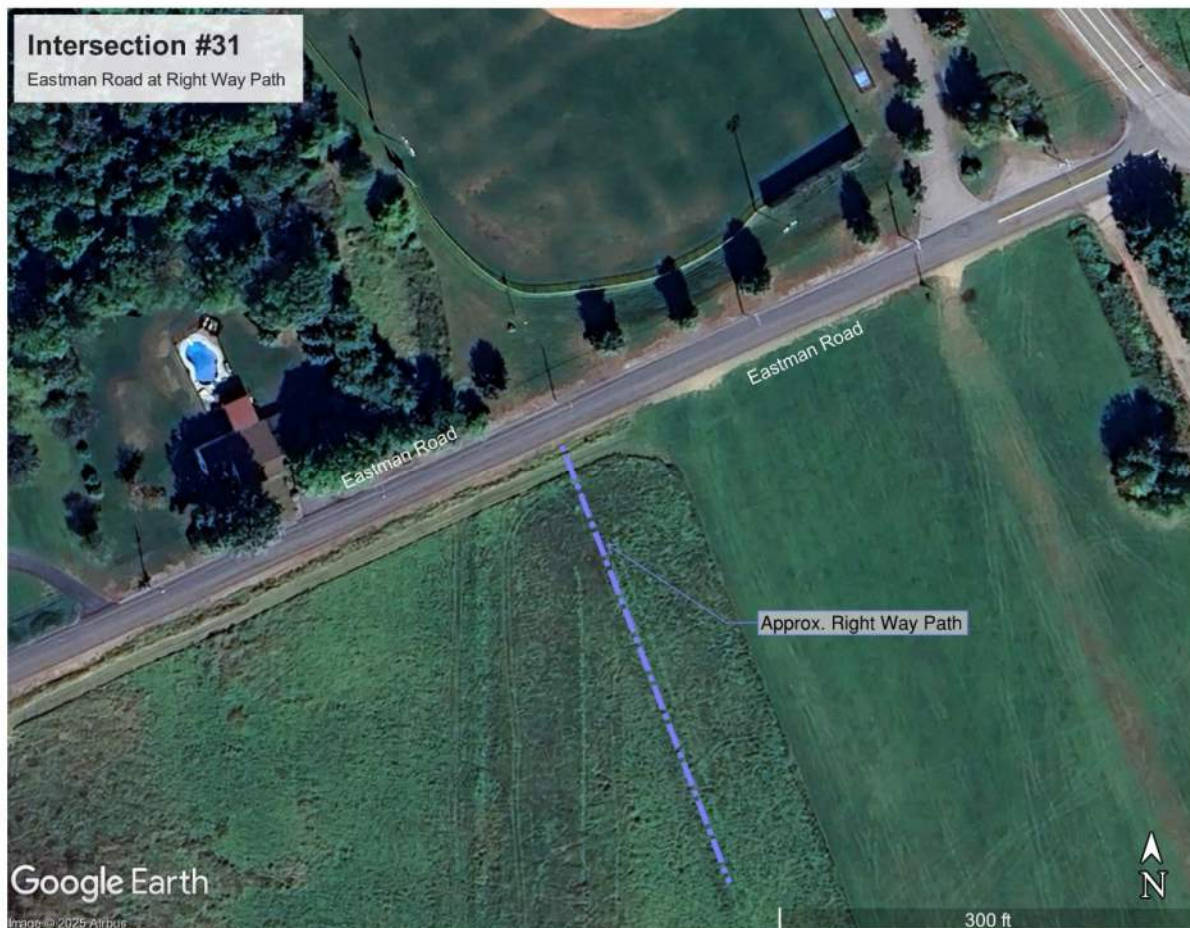
- No mitigation is required at this intersection.

Intersection #31 Eastman Road at (Relocated) Right Way Path

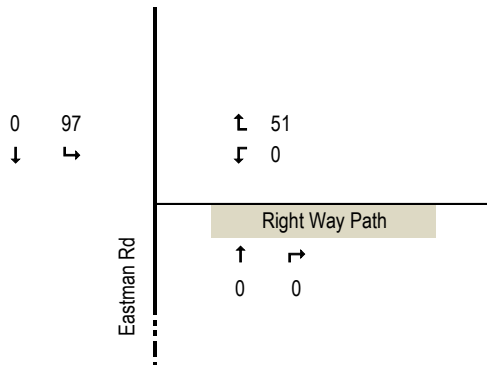
Existing Conditions

The Masterplan calls for a third site access point along Eastman Road along the western edge of the site. This is a relocation of the existing Right Way Path intersection with Eastman Road, currently located only 100' from Meredith Center Road. The new location is approximately 500' farther south, providing better sight distance and safety for Eastman Road traffic.

Eastman Road will form the free-running NB and SB approaches, and the relocated Right Way Path approach forms the westbound "T" stop-controlled approach. All approaches are single-lane approaches. The posted speed limit is 25 mph on Eastman Road and Right Way Path. There is no lighting along the roadway and no pedestrian facilities.

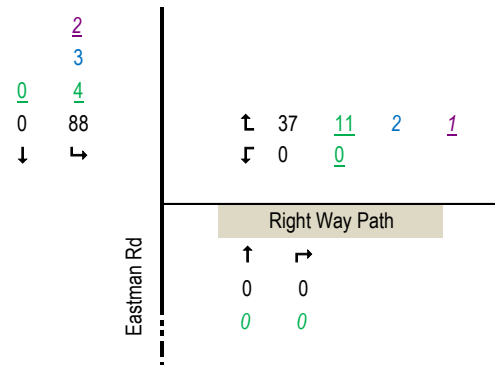


AM Total Site Trips

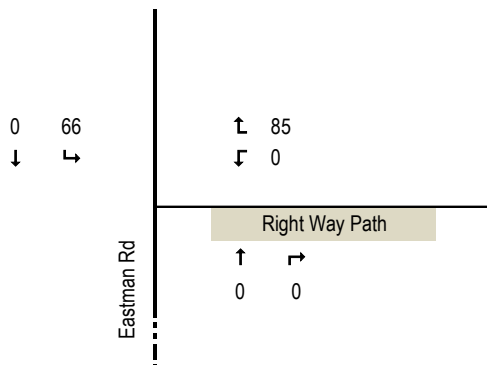


AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

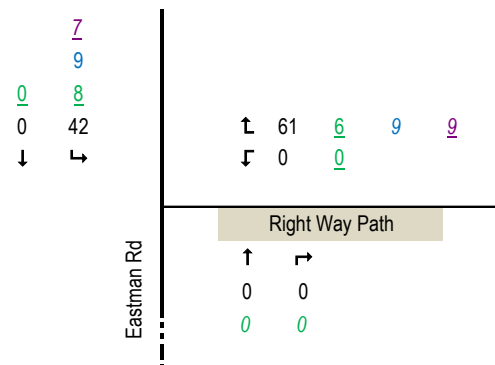


PM Total Site Trips

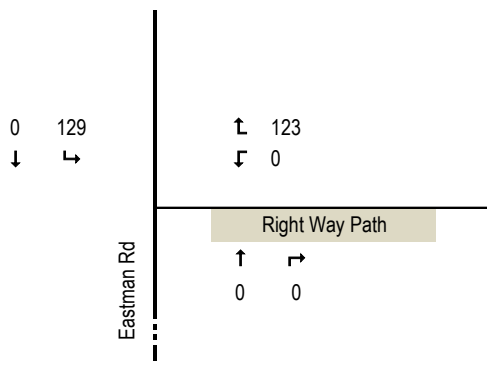


PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

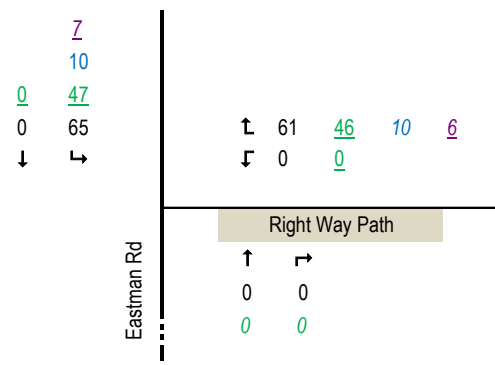


SAT Total Site Trips

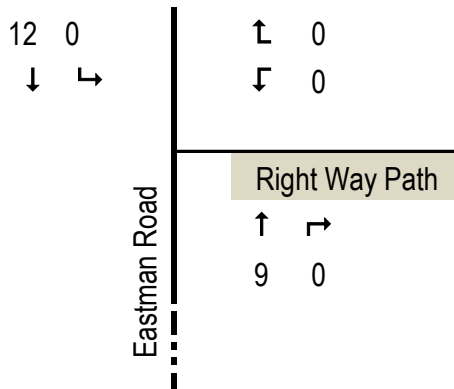


SAT Site Composition Trips

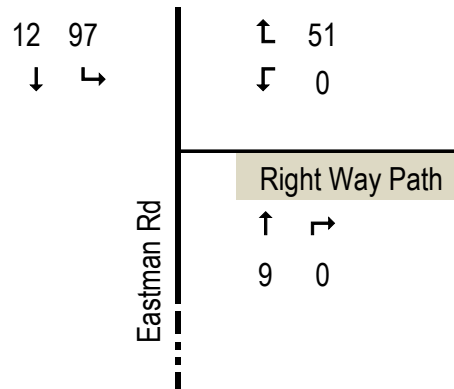
Primary, *Pass-by*, *Diverted Link*, *Residential*



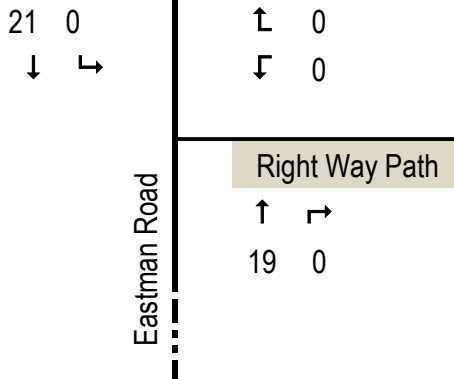
AM 2037 No-Build Volumes



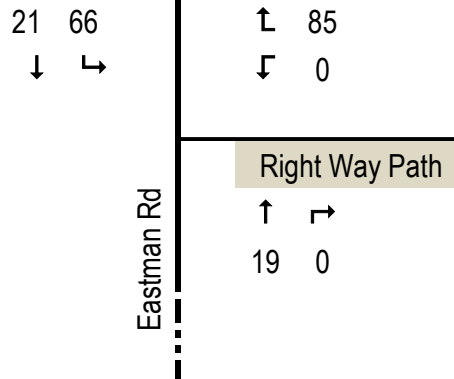
AM 2037 Full Build Volumes



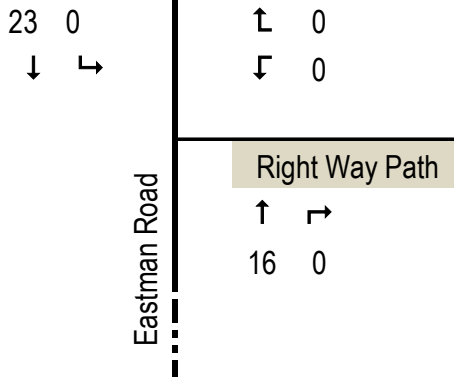
PM 2037 No-Build Volumes



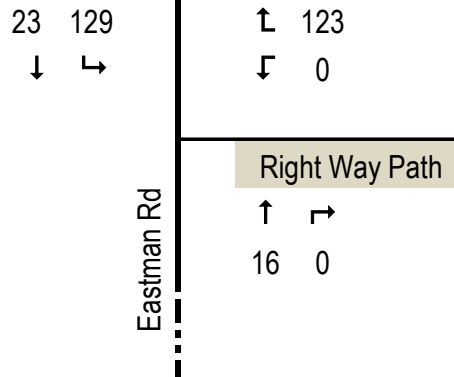
PM 2037 Full Build Volumes



SAT 2037 No-Build Volumes



SAT 2037 Full Build Volumes



Summary of Operating Conditions

Intersection #31: Eastman Road at (Relocated) Right Way Path

	2037 No-Build				2037 Build				2037 Build Mitigation: none			
Movement	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
31: Eastman Road at Right Way Path [Unsignalized]												
AM Peak OVERALL	---	-	-	---	---	6.9	A	---	---			---
WB All	-	-	-	-	0.05	8.5	A	4	NO MIT			
NB All	-	-	-	-	0.01	0.0	A	0				
SB All	-	-	-	-	0.07	6.7	A	5				
PM Peak OVERALL	---	-	-	---	---	6.5	A	---	---			---
WB All	-	-	-	-	0.09	8.7	A	7	NO MIT			
NB All	-	-	-	-	0.01	0.0	A	0				
SB All	-	-	-	-	0.05	5.7	A	4				
SAT Peak OVERALL	---	-	-	---	---	7.1	A	---	---			---
WB All	-	-	-	-	0.13	8.9	A	11	NO MIT			
NB All	-	-	-	-	0.01	0.0	A	0				
SB All	-	-	-	-	0.09	6.4	A	7				

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d 95th percentile queue in feet

Intersection #31: Eastman Road at (Relocated) Right Way Path	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	21	148	87.6%
PM Peak Hour	40	151	79.1%
SAT Peak Hour	39	252	86.6%

Analysis

The relocated Right Way Path provides a third site access point to the site along its western edge. Traffic using this access point will consist mainly of right turns out and left turns in from Eastman Road. Volume is relatively light during all peak hours.

Eastman Road will be free flowing on the NB and SB approaches, and the new WB “T” approach will be stop-controlled. All approaches will be single-lane approaches.

There are no traffic problems at this intersection. With little opposing traffic, all approaches operate at LOS A in Full-Build conditions.

Recommended Mitigation

- No mitigation is required at this intersection.

ATTACHMENTS – Part A (Updated Rev1)

Front Door

Attachments

ATTACHMENT A	<u>Volumes (Peak)</u> (No Change Rev1) • Calculations
ATTACHMENT B	<u>Adjustment</u> (No Change Rev1) • Seasonal • Growth • Heavy Vehicles
ATTACHMENT C	<u>Timings</u> (No Change Rev1)
ATTACHMENT D	<u>Crash Data</u> (No Change Rev1) • Summary • NHDOT raw data
ATTACHMENT E	<u>Intersection #3: Synchro/SIDRA (AM/PM/SAT)</u> (Updated Rev1) • 2037 No-Build (Synchro) • 2037 Build (Synchro) • 2037 Build Mit (SIDRA: 2-lane roundabout) • 2037 Build Mit (SIDRA: 1-lane roundabout)
ATTACHMENT F	<u>Intersection #2: Synchro (AM/PM/SAT)</u> (Updated Rev1) • 2037 No-Build • 2037 Build • 2037 Build Mit • 2037 Build Mit (SIDRA: 2-lane roundabout) • 2037 Build Mit (SIDRA: 1-lane roundabout)
ATTACHMENT G	<u>Intersection #32: Synchro (AM/PM/SAT)</u> (No Change Rev1) • 2037 Build • 2037 Build Mit
ATTACHMENT H	<u>Intersection #4: Synchro (AM/PM/SAT)</u> (No Change Rev1) • 2037 No-Build • 2037 Build
ATTACHMENT I	<u>Intersection #31: Synchro (AM/PM/SAT)</u> (No Change Rev1) • 2037 Build
ATTACHMENT J	<u>Turn Lane Warrants (#32)</u> (No Change Rev1) • Volumes (Ave) • Diagrams • Left Turn Lane Warrant • Right Turn Lane Warrant • Second Lane on Minor Road Warrant
ATTACHMENT K	<u>Aerial Intersection Overlays</u> (Updated Rev1) • #3 Parade Rd at Right Way Path/Old Main - Roundabout • #2 Parade Rd at Meredith/Elm – Signal • #2 Parade Rd at Meredith/Elm – Roundabout

ATTACHMENT E (Updated Rev1)

Intersection #3: Synchro/SIDRA (AM/PM/SAT)

2037 No-Build (Synchro)

2037 Build (Synchro)

2037 Build Mit (SIDRA: 2-lane roundabout)

2037 Build Mit (SIDRA: one lane roundabout)

Lanes, Volumes, Timings

3: Parade Rd (NH106) & Right Way Path/Old North Main St

AM 2037 NB

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	1	6	3	0	28	9	592	2	3	758	0
Future Volume (vph)	1	1	6	3	0	28	9	592	2	3	758	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2205			500			4280			2400	
Travel Time (s)		50.1			11.4			97.3			54.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	34	0	0	670	0	0	845	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

3: Parade Rd (NH106) & Right Way Path/Old North Main St

AM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	1	6	3	0	28	9	592	2	3	758	0
Future Volume (Veh/h)	1	1	6	3	0	28	9	592	2	3	758	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1	1	7	3	0	31	10	658	2	3	842	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1558	1528	842	1534	1527	659	842			660		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1558	1528	842	1534	1527	659	842			660		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	99	99	98	97	100	93	99			100		
cM capacity (veh/h)	84	115	364	91	116	464	777			933		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	9	34	670	845								
Volume Left	1	3	10	3								
Volume Right	7	31	2	0								
cSH	226	341	777	933								
Volume to Capacity	0.04	0.10	0.01	0.00								
Queue Length 95th (ft)	3	8	1	0								
Control Delay (s)	21.6	16.7	0.3	0.1								
Lane LOS	C	C	A	A								
Approach Delay (s)	21.6	16.7	0.3	0.1								
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.7									
Intersection Capacity Utilization			51.5%		ICU Level of Service					A		
Analysis Period (min)			15									

Lanes, Volumes, Timings

AM 2037 B

3: Parade Rd (NH106) & Right Way Path/Old North Main St

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	8	401	3	17	28	281	585	2	3	751	190
Future Volume (vph)	181	8	401	3	17	28	281	585	2	3	751	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2205			500			4280			2400	
Travel Time (s)		50.1			11.4			97.3			54.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	6%	6%	6%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	656	0	0	53	0	0	964	0	0	1048	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

3: Parade Rd (NH106) & Right Way Path/Old North Main St

AM 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	181	8	401	3	17	28	281	585	2	3	751	190
Future Volume (Veh/h)	181	8	401	3	17	28	281	585	2	3	751	190
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	201	9	446	3	19	31	312	650	2	3	834	211
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2261	2222	940	2671	2326	651	1045			652		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2261	2222	940	2671	2326	651	1045			652		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.2			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.3			2.2		
p0 queue free %	0	60	0	0	2	93	52			100		
cM capacity (veh/h)	2	23	320	0	19	469	651			939		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	656	53	964	1048								
Volume Left	201	3	312	3								
Volume Right	446	31	2	211								
cSH	5	0	651	939								
Volume to Capacity	131.99	Err	0.48	0.00								
Queue Length 95th (ft)	Err	Err	65	0								
Control Delay (s)	Err	Err	13.2	0.1								
Lane LOS	F	F	B	A								
Approach Delay (s)	Err	Err	13.2	0.1								
Approach LOS	F	F										
Intersection Summary												
Average Delay			Err									
Intersection Capacity Utilization			149.5%		ICU Level of Service				H			
Analysis Period (min)			15									

LEVEL OF SERVICE

Lane Level of Service



Site: [3] 3-Laconia Village Main (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

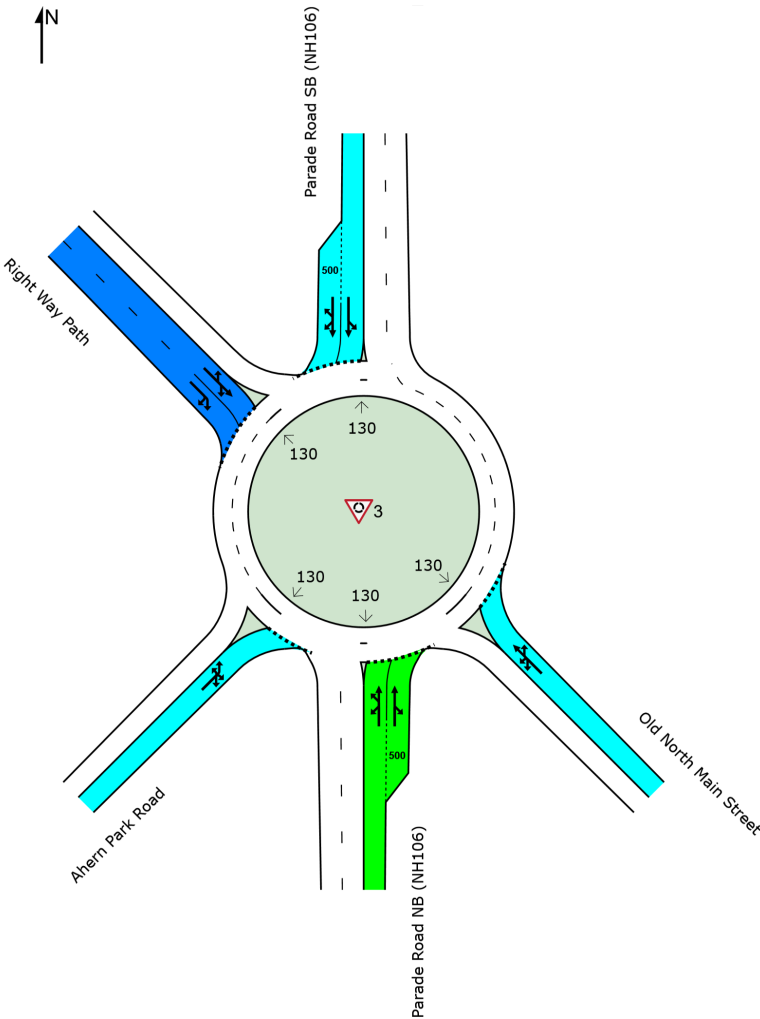
Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 4 | AM 2037 BUILD

	Approaches					Intersection
	South	Southeast	North	Northwest	Southwest	
LOS	A	B	B	C	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:51:11 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [3] 3-Laconia Village Main (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 4 | AM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: Parade Road NB (NH106)															
3b	L3	All MCs	30	6.0	30	6.0	0.471	8.8	LOS A	2.6	67.7	0.50	0.30	0.50	31.1
3a	L1	All MCs	312	6.0	312	6.0	0.471	8.8	LOS A	2.6	67.7	0.50	0.30	0.50	31.1
8	T1	All MCs	650	6.0	650	6.0	0.471	8.5	LOS A	2.6	67.7	0.48	0.29	0.48	33.7
18b	R3	All MCs	2	6.0	2	6.0	0.471	8.5	LOS A	2.5	66.2	0.48	0.29	0.48	33.0
Approach			994	6.0	994	6.0	0.471	8.6	LOS A	2.6	67.7	0.49	0.30	0.49	32.8
SouthEast: Old North Main Street															
3bx	L3	All MCs	4	2.0	4	2.0	0.170	10.4	LOS B	0.5	13.6	0.70	0.70	0.70	31.2
3x	L2	All MCs	22	2.0	22	2.0	0.170	10.4	LOS B	0.5	13.6	0.70	0.70	0.70	30.4
8x	T1	All MCs	19	2.0	19	2.0	0.170	10.4	LOS B	0.5	13.6	0.70	0.70	0.70	31.1
18ax	R1	All MCs	31	2.0	31	2.0	0.170	10.4	LOS B	0.5	13.6	0.70	0.70	0.70	31.8
Approach			77	2.0	77	2.0	0.170	10.4	LOS B	0.5	13.6	0.70	0.70	0.70	31.2
North: Parade Road SB (NH106)															
7a	L1	All MCs	3	1.0	3	1.0	0.584	12.1	LOS B	5.2	130.9	0.70	0.66	1.04	31.4
4	T1	All MCs	834	1.0	834	1.0	0.584	11.8	LOS B	5.2	131.3	0.69	0.65	1.02	32.7
14a	R1	All MCs	60	1.0	60	1.0	0.584	11.4	LOS B	5.2	131.3	0.68	0.63	1.00	32.2
14b	R3	All MCs	211	1.0	211	1.0	0.584	11.4	LOS B	5.2	131.3	0.68	0.63	1.00	31.7
Approach			1109	1.0	1109	1.0	0.584	11.7	LOS B	5.2	131.3	0.69	0.65	1.02	32.5
NorthWest: Right Way Path															
7bx	L3	All MCs	201	2.0	201	2.0	0.588	18.8	LOS C	3.3	84.2	0.78	0.92	1.26	27.6
4x	T1	All MCs	9	2.0	9	2.0	0.588	18.8	LOS C	3.3	84.2	0.78	0.92	1.26	27.2
14ax	R1	All MCs	446	2.0	446	2.0	0.588	17.6	LOS C	3.4	85.5	0.78	0.90	1.25	29.6
14x	R2	All MCs	4	2.0	4	2.0	0.588	17.2	LOS C	3.4	85.5	0.77	0.90	1.25	29.0
Approach			660	2.0	660	2.0	0.588	17.9	LOS C	3.4	85.5	0.78	0.91	1.25	29.0
SouthWest: Ahern Park Road															
5x	L2	All MCs	1	2.0	1	2.0	0.034	10.6	LOS B	0.1	2.5	0.73	0.73	0.73	29.7
5ax	L1	All MCs	7	2.0	7	2.0	0.034	10.6	LOS B	0.1	2.5	0.73	0.73	0.73	30.5
12x	R2	All MCs	1	2.0	1	2.0	0.034	10.6	LOS B	0.1	2.5	0.73	0.73	0.73	30.1
12bx	R3	All MCs	3	2.0	3	2.0	0.034	10.6	LOS B	0.1	2.5	0.73	0.73	0.73	30.7
Approach			12	2.0	12	2.0	0.034	10.6	LOS B	0.1	2.5	0.73	0.73	0.73	30.5
All Vehicles			2852	3.0	2852	3.0	0.588	12.1	LOS B	5.2	131.3	0.64	0.59	0.88	31.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:51:11 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01

ROUNABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [3] 3-Laconia Village Main (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

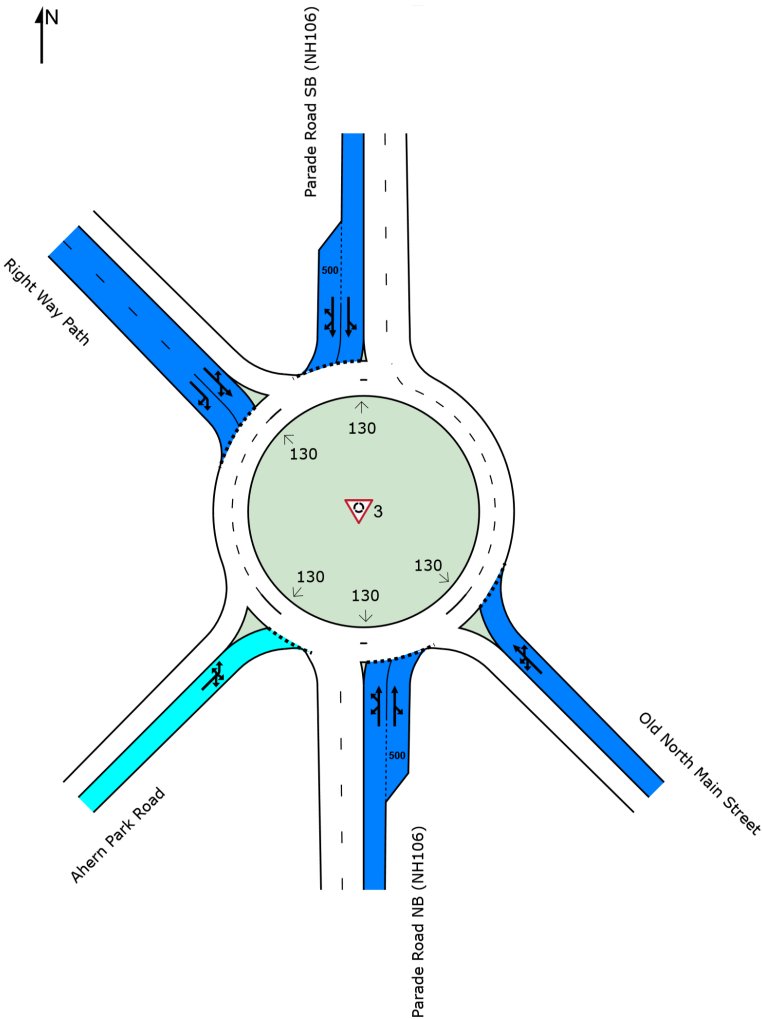
Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 2 | PM 2037 BUILD

	Approaches					Intersection
	South	Southeast	North	Northwest	Southwest	
LOS	C	C	C	C	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:53:02 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [3] 3-Laconia Village Main (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 2 | PM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	Dist] ft				mph
South: Parade Road NB (NH106)															
3b	L3	All MCs	4	1.0	4	1.0	0.754	17.4	LOS C	12.4	312.8	0.85	0.90	1.55	28.3
3a	L1	All MCs	540	1.0	540	1.0	0.754	17.4	LOS C	12.4	312.8	0.85	0.90	1.55	28.3
8	T1	All MCs	974	1.0	974	1.0	0.754	16.7	LOS C	12.7	319.6	0.84	0.88	1.52	30.8
18b	R3	All MCs	6	1.0	6	1.0	0.754	16.5	LOS C	12.7	319.6	0.83	0.87	1.52	30.0
Approach			1524	1.0	1524	1.0	0.754	16.9	LOS C	12.7	319.6	0.84	0.89	1.53	29.9
SouthEast: Old North Main Street															
3bx	L3	All MCs	10	2.0	10	2.0	0.144	16.2	LOS C	0.4	10.1	0.81	0.81	0.81	29.3
3x	L2	All MCs	1	2.0	1	2.0	0.144	16.2	LOS C	0.4	10.1	0.81	0.81	0.81	28.4
8x	T1	All MCs	12	2.0	12	2.0	0.144	16.2	LOS C	0.4	10.1	0.81	0.81	0.81	28.9
18ax	R1	All MCs	16	2.0	16	2.0	0.144	16.2	LOS C	0.4	10.1	0.81	0.81	0.81	29.8
Approach			39	2.0	39	2.0	0.144	16.2	LOS C	0.4	10.1	0.81	0.81	0.81	29.3
North: Parade Road SB (NH106)															
7a	L1	All MCs	29	3.0	29	3.0	0.658	16.5	LOS C	5.7	146.5	0.80	0.87	1.35	29.7
4	T1	All MCs	732	3.0	732	3.0	0.658	16.2	LOS C	5.8	149.1	0.79	0.86	1.34	31.1
14a	R1	All MCs	50	3.0	50	3.0	0.658	15.5	LOS C	5.8	149.1	0.78	0.85	1.33	30.5
14b	R3	All MCs	226	3.0	226	3.0	0.658	15.5	LOS C	5.8	149.1	0.78	0.85	1.33	30.1
Approach			1037	3.0	1037	3.0	0.658	16.0	LOS C	5.8	149.1	0.79	0.86	1.34	30.8
NorthWest: Right Way Path															
7bx	L3	All MCs	267	3.0	267	3.0	0.657	20.3	LOS C	4.4	112.6	0.81	0.96	1.41	27.1
4x	T1	All MCs	21	3.0	21	3.0	0.657	20.3	LOS C	4.4	112.6	0.81	0.96	1.41	26.6
14ax	R1	All MCs	512	3.0	512	3.0	0.657	19.1	LOS C	4.5	114.8	0.80	0.95	1.40	29.2
14x	R2	All MCs	1	3.0	1	3.0	0.657	18.8	LOS C	4.5	114.8	0.80	0.94	1.40	28.4
Approach			801	3.0	801	3.0	0.657	19.5	LOS C	4.5	114.8	0.81	0.95	1.41	28.4
SouthWest: Ahern Park Road															
5x	L2	All MCs	6	2.0	6	2.0	0.167	14.0	LOS B	0.5	12.4	0.78	0.78	0.78	29.0
5ax	L1	All MCs	6	2.0	6	2.0	0.167	14.0	LOS B	0.5	12.4	0.78	0.78	0.78	29.9
12x	R2	All MCs	3	2.0	3	2.0	0.167	14.0	LOS B	0.5	12.4	0.78	0.78	0.78	29.4
12bx	R3	All MCs	40	2.0	40	2.0	0.167	14.0	LOS B	0.5	12.4	0.78	0.78	0.78	30.1
Approach			54	2.0	54	2.0	0.167	14.0	LOS B	0.5	12.4	0.78	0.78	0.78	30.0
All Vehicles			3456	2.1	3456	2.1	0.754	17.2	LOS C	12.7	319.6	0.82	0.89	1.43	29.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:53:02 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01

ROUNDABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [3] 3-Laconia Village Main (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

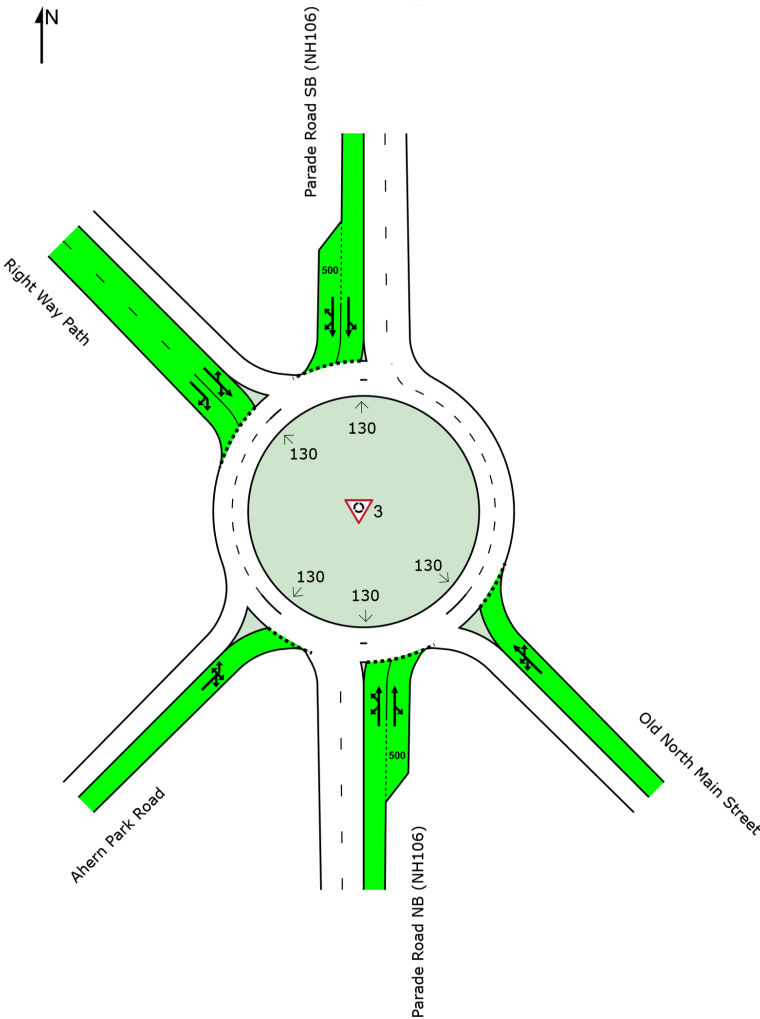
Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 3 | SAT 2037 BUILD

	Approaches					Intersection
	South	Southeast	North	Northwest	Southwest	
LOS	A	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:53:27 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY

 **Site: [3] 3-Laconia Village Main (Front Door)**

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 3 | SAT 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: Parade Road NB (NH106)															
3b	L3	All MCs	17	2.0	17	2.0	0.419	8.3	LOS A	2.1	54.1	0.54	0.37	0.54	31.0
3a	L1	All MCs	356	2.0	356	2.0	0.419	8.3	LOS A	2.1	54.1	0.54	0.37	0.54	31.0
8	T1	All MCs	469	2.0	469	2.0	0.419	7.9	LOS A	2.1	54.1	0.52	0.35	0.52	34.1
18b	R3	All MCs	10	2.0	10	2.0	0.419	7.9	LOS A	2.1	53.3	0.52	0.35	0.52	33.3
Approach			851	2.0	851	2.0	0.419	8.1	LOS A	2.1	54.1	0.53	0.36	0.53	32.7
SouthEast: Old North Main Street															
3bx	L3	All MCs	2	2.0	2	2.0	0.075	8.1	LOS A	0.2	5.9	0.64	0.64	0.64	32.7
3x	L2	All MCs	3	2.0	3	2.0	0.075	8.1	LOS A	0.2	5.9	0.64	0.64	0.64	32.0
8x	T1	All MCs	17	2.0	17	2.0	0.075	8.1	LOS A	0.2	5.9	0.64	0.64	0.64	32.7
18ax	R1	All MCs	16	2.0	16	2.0	0.075	8.1	LOS A	0.2	5.9	0.64	0.64	0.64	33.3
Approach			38	2.0	38	2.0	0.075	8.1	LOS A	0.2	5.9	0.64	0.64	0.64	32.9
North: Parade Road SB (NH106)															
7a	L1	All MCs	16	2.0	16	2.0	0.396	8.5	LOS A	1.9	48.1	0.57	0.43	0.58	32.8
4	T1	All MCs	451	2.0	451	2.0	0.396	8.4	LOS A	1.9	48.1	0.57	0.43	0.57	34.0
14a	R1	All MCs	30	2.0	30	2.0	0.396	8.0	LOS A	1.9	47.2	0.55	0.41	0.55	33.5
14b	R3	All MCs	247	2.0	247	2.0	0.396	8.0	LOS A	1.9	47.2	0.55	0.41	0.55	32.9
Approach			743	2.0	743	2.0	0.396	8.3	LOS A	1.9	48.1	0.56	0.42	0.56	33.6
NorthWest: Right Way Path															
7bx	L3	All MCs	244	2.0	244	2.0	0.358	8.7	LOS A	1.6	40.9	0.60	0.50	0.63	30.4
4x	T1	All MCs	16	2.0	16	2.0	0.358	8.7	LOS A	1.6	40.9	0.60	0.50	0.63	30.2
14ax	R1	All MCs	336	2.0	336	2.0	0.358	8.2	LOS A	1.6	40.9	0.58	0.48	0.60	33.5
14x	R2	All MCs	6	2.0	6	2.0	0.358	8.1	LOS A	1.6	39.7	0.58	0.47	0.59	32.8
Approach			601	2.0	601	2.0	0.358	8.4	LOS A	1.6	40.9	0.59	0.49	0.61	32.0
SouthWest: Ahern Park Road															
5x	L2	All MCs	6	2.0	6	2.0	0.105	8.1	LOS A	0.3	8.5	0.63	0.63	0.63	30.7
5ax	L1	All MCs	30	2.0	30	2.0	0.105	8.1	LOS A	0.3	8.5	0.63	0.63	0.63	31.5
12x	R2	All MCs	3	2.0	3	2.0	0.105	8.1	LOS A	0.3	8.5	0.63	0.63	0.63	31.1
12bx	R3	All MCs	17	2.0	17	2.0	0.105	8.1	LOS A	0.3	8.5	0.63	0.63	0.63	31.7
Approach			56	2.0	56	2.0	0.105	8.1	LOS A	0.3	8.5	0.63	0.63	0.63	31.4
All Vehicles			2289	2.0	2289	2.0	0.419	8.2	LOS A	2.1	54.1	0.56	0.42	0.56	32.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:53:27 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01

ROUNDABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [3 (2)] 3-Laconia Village Main_onelane_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

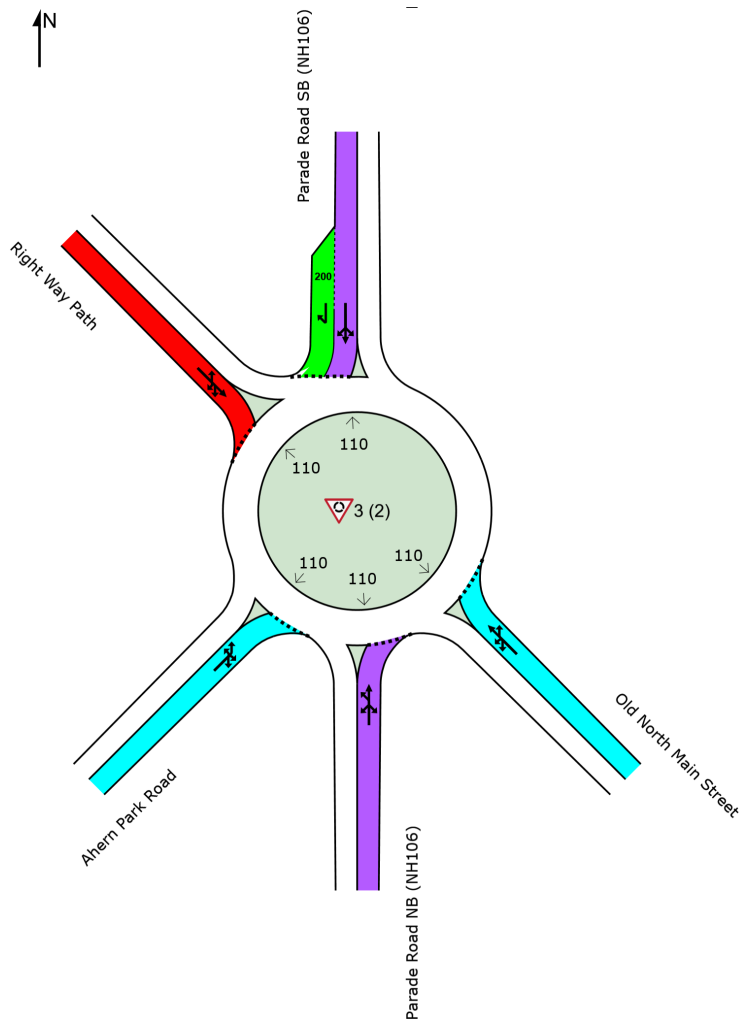
Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 4 | AM 2037 BUILD

	Approaches					Intersection
	South	Southeast	North	Northwest	Southwest	
LOS	D	B	D	F	B	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:55:43 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY

 **Site: [3 (2)] 3-Laconia Village Main_onelane_r1 (Front Door)**
Output produced by SIDRA INTERSECTION Version: 10.0.8.241

Main Entrance
Site Category: Future Conditions 1
Roundabout
Site Scenario: 4 | AM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: Parade Road NB (NH106)															
3b	L3	All MCs	30	6.0	30	6.0	0.916	27.9	LOS D	38.1	997.0	1.00	1.26	1.99	25.6
3a	L1	All MCs	312	6.0	312	6.0	0.916	27.9	LOS D	38.1	997.0	1.00	1.26	1.99	25.6
8	T1	All MCs	650	6.0	650	6.0	0.916	27.9	LOS D	38.1	997.0	1.00	1.26	1.99	27.0
18b	R3	All MCs	2	6.0	2	6.0	0.916	27.9	LOS D	38.1	997.0	1.00	1.26	1.99	25.8
Approach			994	6.0	994	6.0	0.916	27.9	LOS D	38.1	997.0	1.00	1.26	1.99	26.5
SouthEast: Old North Main Street															
3bx	L3	All MCs	4	2.0	4	2.0	0.201	12.8	LOS B	0.7	17.9	0.75	0.75	0.75	30.2
3x	L2	All MCs	22	2.0	22	2.0	0.201	12.8	LOS B	0.7	17.9	0.75	0.75	0.75	29.3
8x	T1	All MCs	19	2.0	19	2.0	0.201	12.8	LOS B	0.7	17.9	0.75	0.75	0.75	29.9
18ax	R1	All MCs	31	2.0	31	2.0	0.201	12.8	LOS B	0.7	17.9	0.75	0.75	0.75	30.7
Approach			77	2.0	77	2.0	0.201	12.8	LOS B	0.7	17.9	0.75	0.75	0.75	30.1
North: Parade Road SB (NH106)															
7a	L1	All MCs	3	1.0	3	1.0	0.933	34.2	LOS D	27.8	699.4	1.00	1.61	2.83	24.6
4	T1	All MCs	834	1.0	834	1.0	0.933	34.2	LOS D	27.8	699.4	1.00	1.61	2.83	25.8
14a	R1	All MCs	60	1.0	60	1.0	0.933	34.2	LOS D	27.8	699.4	1.00	1.61	2.83	24.9
14b	R3	All MCs	211	1.0	211	1.0	0.219	5.9	LOS A	0.9	23.6	0.50	0.37	0.50	33.5
Approach			1109	1.0	1109	1.0	0.933	28.8	LOS D	27.8	699.4	0.90	1.37	2.38	26.9
NorthWest: Right Way Path															
7bx	L3	All MCs	201	2.0	201	2.0	1.335	185.6	LOS F	59.4	1509.4	1.00	3.64	9.83	12.4
4x	T1	All MCs	9	2.0	9	2.0	1.335	185.6	LOS F	59.4	1509.4	1.00	3.64	9.83	11.5
14ax	R1	All MCs	446	2.0	446	2.0	1.335	185.6	LOS F	59.4	1509.4	1.00	3.64	9.83	12.4
14x	R2	All MCs	4	2.0	4	2.0	1.335	185.6	LOS F	59.4	1509.4	1.00	3.64	9.83	11.5
Approach			660	2.0	660	2.0	1.335	185.6	LOS F	59.4	1509.4	1.00	3.64	9.83	12.4
SouthWest: Ahern Park Road															
5x	L2	All MCs	1	2.0	1	2.0	0.037	11.5	LOS B	0.1	3.1	0.76	0.76	0.76	29.2
5ax	L1	All MCs	7	2.0	7	2.0	0.037	11.5	LOS B	0.1	3.1	0.76	0.76	0.76	30.1
12x	R2	All MCs	1	2.0	1	2.0	0.037	11.5	LOS B	0.1	3.1	0.76	0.76	0.76	29.6
12bx	R3	All MCs	3	2.0	3	2.0	0.037	11.5	LOS B	0.1	3.1	0.76	0.76	0.76	30.3
Approach			12	2.0	12	2.0	0.037	11.5	LOS B	0.1	3.1	0.76	0.76	0.76	30.0
All Vehicles			2852	3.0	2852	3.0	1.335	64.3	LOS F	59.4	1509.4	0.96	1.84	3.92	21.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:55:43 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01

ROUNDABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [3 (2)] 3-Laconia Village Main_onelane_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

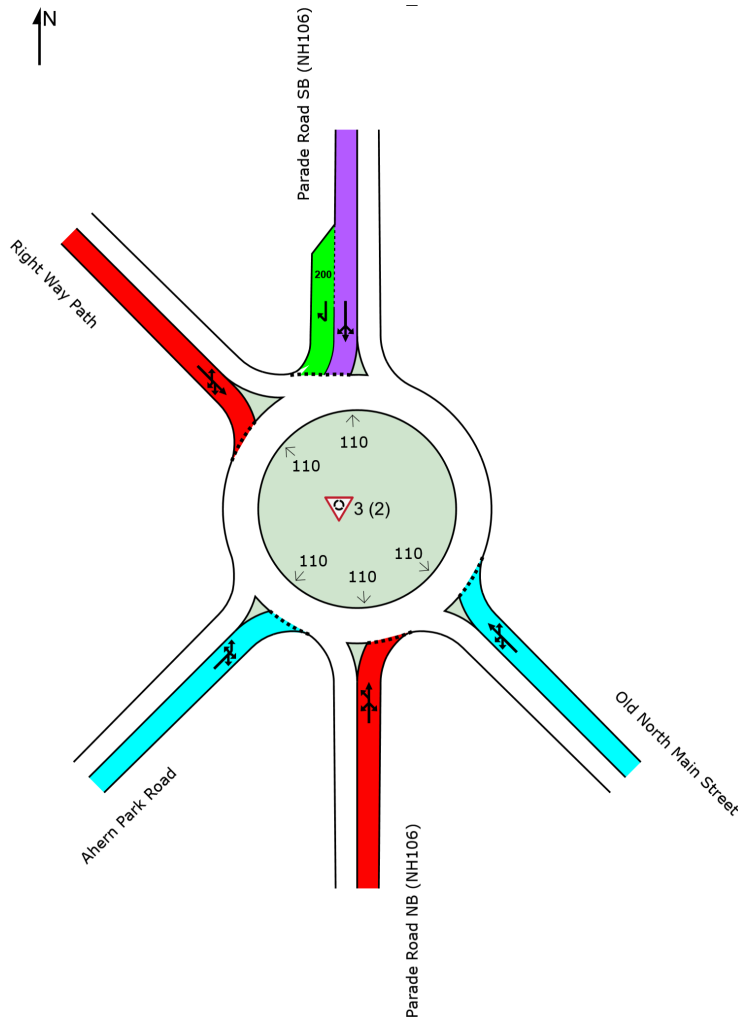
Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 2 | PM 2037 BUILD

	Approaches					Intersection
	South	Southeast	North	Northwest	Southwest	
LOS	F	B	C	F	B	F



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:56:56 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [3 (2)] 3-Laconia Village Main_onelane_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 2 | PM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] ft				mph
South: Parade Road NB (NH106)															
3b	L3	All MCs	4	1.0	4	1.0	1.439	210.7	LOS F	173.7	4376.9	1.00	4.43	8.07	9.1
3a	L1	All MCs	540	1.0	540	1.0	1.439	210.7	LOS F	173.7	4376.9	1.00	4.43	8.07	9.1
8	T1	All MCs	974	1.0	974	1.0	1.439	210.7	LOS F	173.7	4376.9	1.00	4.43	8.07	9.9
18b	R3	All MCs	6	1.0	6	1.0	1.439	210.7	LOS F	173.7	4376.9	1.00	4.43	8.07	9.1
Approach			1524	1.0	1524	1.0	1.439	210.7	LOS F	173.7	4376.9	1.00	4.43	8.07	9.6
SouthEast: Old North Main Street															
3bx	L3	All MCs	10	2.0	10	2.0	0.107	11.7	LOS B	0.4	9.2	0.75	0.75	0.75	30.6
3x	L2	All MCs	1	2.0	1	2.0	0.107	11.7	LOS B	0.4	9.2	0.75	0.75	0.75	29.8
8x	T1	All MCs	12	2.0	12	2.0	0.107	11.7	LOS B	0.4	9.2	0.75	0.75	0.75	30.4
18ax	R1	All MCs	16	2.0	16	2.0	0.107	11.7	LOS B	0.4	9.2	0.75	0.75	0.75	31.2
Approach			39	2.0	39	2.0	0.107	11.7	LOS B	0.4	9.2	0.75	0.75	0.75	30.8
North: Parade Road SB (NH106)															
7a	L1	All MCs	29	3.0	29	3.0	0.867	26.3	LOS D	19.2	491.7	1.00	1.30	2.30	26.5
4	T1	All MCs	732	3.0	732	3.0	0.867	26.3	LOS D	19.2	491.7	1.00	1.30	2.30	27.8
14a	R1	All MCs	50	3.0	50	3.0	0.867	26.3	LOS D	19.2	491.7	1.00	1.30	2.30	26.9
14b	R3	All MCs	226	3.0	226	3.0	0.241	6.3	LOS A	1.0	26.1	0.51	0.37	0.51	33.3
Approach			1037	3.0	1037	3.0	0.867	22.0	LOS C	19.2	491.7	0.89	1.10	1.91	28.7
NorthWest: Right Way Path															
7bx	L3	All MCs	267	3.0	267	3.0	1.461	235.3	LOS F	86.8	2220.9	1.00	4.47	12.08	10.9
4x	T1	All MCs	21	3.0	21	3.0	1.461	235.3	LOS F	86.8	2220.9	1.00	4.47	12.08	10.1
14ax	R1	All MCs	512	3.0	512	3.0	1.461	235.3	LOS F	86.8	2220.9	1.00	4.47	12.08	11.0
14x	R2	All MCs	1	3.0	1	3.0	1.461	235.3	LOS F	86.8	2220.9	1.00	4.47	12.08	10.1
Approach			801	3.0	801	3.0	1.461	235.3	LOS F	86.8	2220.9	1.00	4.47	12.08	10.9
SouthWest: Ahern Park Road															
5x	L2	All MCs	6	2.0	6	2.0	0.167	14.0	LOS B	0.6	14.2	0.78	0.78	0.78	28.9
5ax	L1	All MCs	6	2.0	6	2.0	0.167	14.0	LOS B	0.6	14.2	0.78	0.78	0.78	29.8
12x	R2	All MCs	3	2.0	3	2.0	0.167	14.0	LOS B	0.6	14.2	0.78	0.78	0.78	29.2
12bx	R3	All MCs	40	2.0	40	2.0	0.167	14.0	LOS B	0.6	14.2	0.78	0.78	0.78	30.0
Approach			54	2.0	54	2.0	0.167	14.0	LOS B	0.6	14.2	0.78	0.78	0.78	29.8
All Vehicles			3456	2.1	3456	2.1	1.461	154.5	LOS F	173.7	4376.9	0.96	3.34	6.96	12.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:56:56 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01

ROUNDABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [3 (2)] 3-Laconia Village Main_onelane_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

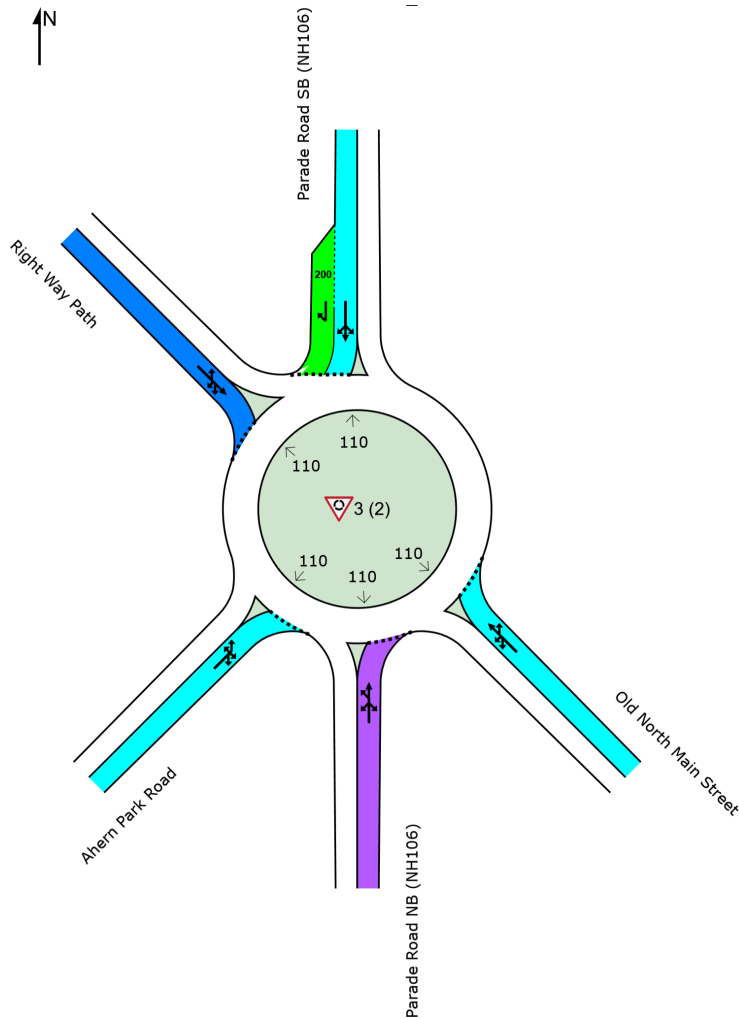
Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 3 | SAT 2037 BUILD

	Approaches					Intersection
	South	Southeast	North	Northwest	Southwest	
LOS	D	B	A	C	B	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:57:17 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [3 (2)] 3-Laconia Village Main_onelane_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

Main Entrance

Site Category: Future Conditions 1

Roundabout

Site Scenario: 3 | SAT 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	[Dist] ft				mph
South: Parade Road NB (NH106)															
3b	L3	All MCs	17	2.0	17	2.0	0.877	26.4	LOS D	24.0	608.9	1.00	1.31	2.24	26.0
3a	L1	All MCs	356	2.0	356	2.0	0.877	26.4	LOS D	24.0	608.9	1.00	1.31	2.24	26.0
8	T1	All MCs	469	2.0	469	2.0	0.877	26.4	LOS D	24.0	608.9	1.00	1.31	2.24	27.3
18b	R3	All MCs	10	2.0	10	2.0	0.877	26.4	LOS D	24.0	608.9	1.00	1.31	2.24	26.1
Approach			851	2.0	851	2.0	0.877	26.4	LOS D	24.0	608.9	1.00	1.31	2.24	26.7
SouthEast: Old North Main Street															
3bx	L3	All MCs	2	2.0	2	2.0	0.092	10.1	LOS B	0.3	8.1	0.71	0.71	0.71	31.6
3x	L2	All MCs	3	2.0	3	2.0	0.092	10.1	LOS B	0.3	8.1	0.71	0.71	0.71	30.8
8x	T1	All MCs	17	2.0	17	2.0	0.092	10.1	LOS B	0.3	8.1	0.71	0.71	0.71	31.5
18ax	R1	All MCs	16	2.0	16	2.0	0.092	10.1	LOS B	0.3	8.1	0.71	0.71	0.71	32.2
Approach			38	2.0	38	2.0	0.092	10.1	LOS B	0.3	8.1	0.71	0.71	0.71	31.7
North: Parade Road SB (NH106)															
7a	L1	All MCs	16	2.0	16	2.0	0.523	10.4	LOS B	3.9	98.1	0.66	0.57	0.86	31.8
4	T1	All MCs	451	2.0	451	2.0	0.523	10.4	LOS B	3.9	98.1	0.66	0.57	0.86	33.0
14a	R1	All MCs	30	2.0	30	2.0	0.523	10.4	LOS B	3.9	98.1	0.66	0.57	0.86	32.4
14b	R3	All MCs	247	2.0	247	2.0	0.260	6.4	LOS A	1.1	28.7	0.51	0.38	0.51	33.3
Approach			743	2.0	743	2.0	0.523	9.0	LOS A	3.9	98.1	0.61	0.50	0.74	33.0
NorthWest: Right Way Path															
7bx	L3	All MCs	244	2.0	244	2.0	0.770	21.6	LOS C	10.2	257.9	0.93	1.08	1.81	27.2
4x	T1	All MCs	16	2.0	16	2.0	0.770	21.6	LOS C	10.2	257.9	0.93	1.08	1.81	26.6
14ax	R1	All MCs	336	2.0	336	2.0	0.770	21.6	LOS C	10.2	257.9	0.93	1.08	1.81	27.6
14x	R2	All MCs	6	2.0	6	2.0	0.770	21.6	LOS C	10.2	257.9	0.93	1.08	1.81	26.4
Approach			601	2.0	601	2.0	0.770	21.6	LOS C	10.2	257.9	0.93	1.08	1.81	27.4
SouthWest: Ahern Park Road															
5x	L2	All MCs	6	2.0	6	2.0	0.128	10.1	LOS B	0.4	11.4	0.70	0.70	0.70	29.8
5ax	L1	All MCs	30	2.0	30	2.0	0.128	10.1	LOS B	0.4	11.4	0.70	0.70	0.70	30.6
12x	R2	All MCs	3	2.0	3	2.0	0.128	10.1	LOS B	0.4	11.4	0.70	0.70	0.70	30.1
12bx	R3	All MCs	17	2.0	17	2.0	0.128	10.1	LOS B	0.4	11.4	0.70	0.70	0.70	30.8
Approach			56	2.0	56	2.0	0.128	10.1	LOS B	0.4	11.4	0.70	0.70	0.70	30.6
All Vehicles			2289	2.0	2289	2.0	0.877	18.8	LOS C	24.0	608.9	0.84	0.96	1.58	28.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Sieglösch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 9:57:17 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01

ROUNDABOUT_r1.sipx

ATTACHMENT F (Updated Rev1)

Intersection #2: Synchro (AM/PM/SAT)

2037 No-Build

2037 Build

2037 Build Mit

2037 Build Mit (SIDRA: 2-lane roundabout)

2037 Build Mit (SIDRA: one lane roundabout)

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

AM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	141	264	65	118	120	149	343	91	163	439	5
Future Volume (vph)	5	141	264	65	118	120	149	343	91	163	439	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		75	150		150	150		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			2400			2280	
Travel Time (s)		38.2			23.7			54.5			51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	6%	6%	6%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	163	293	0	203	133	166	381	101	181	494	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	14.0	14.0	11.0	14.0	
Total Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	26.0	36.0	36.0	26.0	36.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.5%	36.7%	36.7%	26.5%	36.7%	
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	30.0	20.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
v/c Ratio		0.36	0.48		0.55	0.28	0.47	0.59	0.16	0.48	0.72	
Control Delay		26.6	6.3		31.4	6.6	32.3	24.4	5.3	31.8	28.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		26.6	6.3		31.4	6.6	32.3	24.4	5.3	31.8	28.2	
Queue Length 50th (ft)		60	0		79	0	66	129	0	71	178	
Queue Length 95th (ft)		129	58		165	41	145	281	33	154	376	
Internal Link Dist (ft)		1600			962			2320			2200	
Turn Bay Length (ft)			125			75	150		150	150		

Lanes, Volumes, Timings

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

AM 2037 NB

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		861	895		709	797	553	847	773	575	881	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.19	0.33		0.29	0.17	0.30	0.45	0.13	0.31	0.56	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 71.2

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø4
26 s	36 s	36 s
 Ø5	 Ø6	 Ø8
26 s	36 s	36 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

AM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	141	264	65	118	120	149	343	91	163	439	5
Future Volume (vph)	5	141	264	65	118	120	149	343	91	163	439	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1841	1568		1778	1538	1703	1792	1524	1770	1859	
Flt Permitted		0.99	1.00		0.83	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1820	1568		1503	1538	1703	1792	1524	1770	1859	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	157	293	72	131	133	166	381	101	181	488	6
RTOR Reduction (vph)	0	0	220	0	0	100	0	0	64	0	1	0
Lane Group Flow (vph)	0	163	73	0	203	33	166	381	37	181	493	0
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	6%	6%	6%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Actuated Green, G (s)		15.5	15.5		15.5	15.5	12.7	23.6	23.6	13.1	24.0	
Effective Green, g (s)		17.5	17.5		17.5	17.5	14.7	25.6	25.6	15.1	26.0	
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.21	0.36	0.36	0.22	0.37	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		453	390		374	383	356	653	555	380	688	
v/s Ratio Prot							0.10	0.21		c0.10	c0.27	
v/s Ratio Perm		0.09	0.05		c0.14	0.02			0.02			
v/c Ratio		0.36	0.19		0.54	0.09	0.47	0.58	0.07	0.48	0.72	
Uniform Delay, d1		21.7	20.8		22.9	20.2	24.3	18.0	14.5	24.1	18.9	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5	0.2		1.6	0.1	1.0	1.3	0.1	0.9	3.6	
Delay (s)		22.2	21.0		24.5	20.3	25.3	19.3	14.6	25.0	22.5	
Level of Service		C	C		C	C	C	B	B	C	C	
Approach Delay (s)		21.4			22.8			20.1			23.2	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			21.8				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			70.2				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			62.5%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

AM 2037 B

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Future Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		75	150		150	150		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			2400			2280	
Travel Time (s)		38.2			23.7			54.5			51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	6%	6%	6%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	319	293	0	348	133	166	476	202	181	690	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	14.0	14.0	11.0	14.0	
Total Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	26.0	36.0	36.0	26.0	36.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.5%	36.7%	36.7%	26.5%	36.7%	
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	30.0	20.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
v/c Ratio		0.75	0.40		1.09	0.22	0.56	0.77	0.32	0.58	1.07	
Control Delay		40.4	4.7		108.5	8.7	42.3	37.8	7.8	42.3	88.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		40.4	4.7		108.5	8.7	42.3	37.8	7.8	42.3	88.2	
Queue Length 50th (ft)		163	0		~232	13	90	246	16	98	~450	
Queue Length 95th (ft)		#321	57		#432	56	153	#434	69	165	#729	
Internal Link Dist (ft)		1600			962			2320			2200	
Turn Bay Length (ft)			125			75	150		150	150		

Lanes, Volumes, Timings

AM 2037 B

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		427	735		319	598	406	621	634	422	642	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.75	0.40		1.09	0.22	0.41	0.77	0.32	0.43	1.07	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 92.4

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø4
26 s	36 s	36 s
 Ø5	 Ø6	 Ø8
26 s	36 s	36 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

AM 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Future Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1822	1568		1770	1538	1703	1792	1524	1770	1829	
Flt Permitted		0.67	1.00		0.51	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1232	1568		923	1538	1703	1792	1524	1770	1829	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	241	293	156	192	133	166	476	202	181	606	84
RTOR Reduction (vph)	0	0	191	0	0	65	0	0	106	0	5	0
Lane Group Flow (vph)	0	319	102	0	348	68	166	476	96	181	685	0
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	6%	6%	6%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Actuated Green, G (s)		30.1	30.1		30.1	30.1	14.1	29.9	29.9	14.4	30.2	
Effective Green, g (s)		32.1	32.1		32.1	32.1	16.1	31.9	31.9	16.4	32.2	
Actuated g/C Ratio		0.35	0.35		0.35	0.35	0.17	0.35	0.35	0.18	0.35	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		428	544		320	534	296	618	526	314	637	
v/s Ratio Prot							0.10	0.27		c0.10	c0.37	
v/s Ratio Perm		0.26	0.06		c0.38	0.04			0.06			
v/c Ratio		0.75	0.19		1.09	0.13	0.56	0.77	0.18	0.58	1.08	
Uniform Delay, d1		26.6	21.0		30.2	20.6	34.9	27.0	21.1	34.8	30.1	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		6.9	0.2		75.7	0.1	2.4	5.9	0.2	2.6	57.5	
Delay (s)		33.5	21.2		105.9	20.7	37.3	32.9	21.3	37.4	87.6	
Level of Service		C	C		F	C	D	C	C	D	F	
Approach Delay (s)		27.6			82.3			31.0			77.2	
Approach LOS		C			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			53.4									
HCM 2000 Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			92.4									
Intersection Capacity Utilization			87.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

AM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Future Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		75	90		0	150		150	150		150
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	75			100			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			878			825	
Travel Time (s)		38.2			23.7			20.0			18.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	6%	6%	6%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	241	293	156	325	0	166	678	0	181	690	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		4.0	8.0		4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	14.0		11.0	14.0	
Total Split (s)	16.0	46.0	46.0	18.0	48.0		19.0	36.0		20.0	37.0	
Total Split (%)	13.3%	38.3%	38.3%	15.0%	40.0%		15.8%	30.0%		16.7%	30.8%	
Maximum Green (s)	10.0	40.0	40.0	12.0	42.0		13.0	30.0		14.0	31.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
v/c Ratio	0.38	0.56	0.55	0.62	0.62		0.63	0.71		0.63	0.69	
Control Delay	48.0	37.5	12.6	52.5	33.2		51.6	33.2		50.1	33.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.0	37.5	12.6	52.5	33.2		51.6	33.2		50.1	33.5	
Queue Length 50th (ft)	44	129	34	90	161		95	178		103	188	
Queue Length 95th (ft)	102	215	113	#203	270		#211	274		#219	286	
Internal Link Dist (ft)		1600			962			798			745	
Turn Bay Length (ft)	75		75	90			150			150		

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	232	856	847	265	842		282	1184		312	1274	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.34	0.28	0.35	0.59	0.39		0.59	0.57		0.58	0.54	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 92.9

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø3	 Ø4
19 s	37 s	18 s	46 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	36 s	16 s	48 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

AM 2037 B-MIT
Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Future Volume (vph)	70	217	264	140	173	120	149	428	182	163	545	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1845	1568	1719	1698		1703	3253		1770	3475	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1752	1845	1568	1719	1698		1703	3253		1770	3475	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	241	293	156	192	133	166	476	202	181	606	84
RTOR Reduction (vph)	0	0	169	0	23	0	0	38	0	0	9	0
Lane Group Flow (vph)	78	241	124	156	302	0	166	640	0	181	681	0
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	6%	6%	6%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	7.2	21.2	21.2	11.6	25.6		12.4	24.0		13.1	24.7	
Effective Green, g (s)	9.2	23.2	23.2	13.6	27.6		14.4	26.0		15.1	26.7	
Actuated g/C Ratio	0.10	0.25	0.25	0.14	0.29		0.15	0.28		0.16	0.28	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	171	455	387	248	499		261	900		284	988	
v/s Ratio Prot	0.04	0.13		c0.09	c0.18		0.10	c0.20		c0.10	0.20	
v/s Ratio Perm			0.08									
v/c Ratio	0.46	0.53	0.32	0.63	0.60		0.64	0.71		0.64	0.69	
Uniform Delay, d1	40.0	30.6	28.9	37.8	28.5		37.3	30.6		36.8	29.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	1.1	0.5	4.9	2.1		5.0	2.7		4.6	2.0	
Delay (s)	41.9	31.7	29.4	42.7	30.5		42.3	33.2		41.5	31.9	
Level of Service	D	C	C	D	C		D	C		D	C	
Approach Delay (s)		31.9			34.5			35.0			33.9	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			33.9			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			93.9			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			60.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	167	179	114	144	165	241	499	204	163	420	3
Future Volume (vph)	2	167	179	114	144	165	241	499	204	163	420	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		75	150		150	150		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			2400			2280	
Travel Time (s)		38.2			23.7			54.5			51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	188	199	0	287	183	268	554	227	170	441	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	14.0	14.0	11.0	14.0	
Total Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	26.0	36.0	36.0	26.0	36.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.5%	36.7%	36.7%	26.5%	36.7%	
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	30.0	20.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
v/c Ratio		0.34	0.33		0.75	0.32	0.68	0.80	0.33	0.52	0.72	
Control Delay		26.0	5.3		41.1	9.1	41.6	36.8	9.5	38.9	34.2	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		26.0	5.3		41.1	9.1	41.6	36.8	9.5	38.9	34.2	
Queue Length 50th (ft)		80	0		141	17	136	271	26	87	218	
Queue Length 95th (ft)		145	48		251	68	241	#526	89	155	357	
Internal Link Dist (ft)		1600			962			2320			2200	
Turn Bay Length (ft)			125			75	150		150	150		

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		731	743		507	707	484	756	736	474	725	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.26	0.27		0.57	0.26	0.55	0.73	0.31	0.36	0.61	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 84.2

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø4
26 s	36 s	36 s
 Ø5	 Ø6	 Ø8
26 s	36 s	36 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	167	179	114	144	165	241	499	204	163	420	3
Future Volume (vph)	2	167	179	114	144	165	241	499	204	163	420	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1862	1583		1822	1583	1787	1881	1599	1752	1843	
Flt Permitted		1.00	1.00		0.69	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1857	1583		1287	1583	1787	1881	1599	1752	1843	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.96	0.96
Adj. Flow (vph)	2	186	199	127	160	183	268	554	227	170	438	3
RTOR Reduction (vph)	0	0	139	0	0	97	0	0	98	0	0	0
Lane Group Flow (vph)	0	188	60	0	287	86	268	554	129	170	441	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Actuated Green, G (s)		23.0	23.0		23.0	23.0	16.6	28.8	28.8	13.7	25.9	
Effective Green, g (s)		25.0	25.0		25.0	25.0	18.6	30.8	30.8	15.7	27.9	
Actuated g/C Ratio		0.30	0.30		0.30	0.30	0.22	0.37	0.37	0.19	0.33	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		555	473		385	473	398	693	589	329	615	
v/s Ratio Prot							c0.15	c0.29		0.10	0.24	
v/s Ratio Perm		0.10	0.04		c0.22	0.05			0.08			
v/c Ratio		0.34	0.13		0.75	0.18	0.67	0.80	0.22	0.52	0.72	
Uniform Delay, d1		22.8	21.3		26.4	21.7	29.7	23.6	18.1	30.5	24.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.4	0.1		7.6	0.2	4.5	6.4	0.2	1.4	4.0	
Delay (s)		23.2	21.4		34.0	21.9	34.1	30.0	18.3	31.9	28.3	
Level of Service		C	C		C	C	C	C	B	C	C	
Approach Delay (s)		22.3			29.3			28.5			29.3	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.9				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			83.5				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			71.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

PM 2037 B

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Future Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		75	150		150	150		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			2400			2280	
Travel Time (s)		38.2			23.7			54.5			51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	382	199	0	477	183	268	660	323	170	617	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	14.0	14.0	11.0	14.0	
Total Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	26.0	36.0	36.0	26.0	36.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.5%	36.7%	36.7%	26.5%	36.7%	
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	30.0	20.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
v/c Ratio		1.69	0.31		1.94	0.31	0.73	0.96	0.46	0.56	1.01	
Control Delay		356.0	7.1		460.6	13.0	48.1	56.5	12.4	43.5	72.6	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		356.0	7.1		460.6	13.0	48.1	56.5	12.4	43.5	72.6	
Queue Length 50th (ft)		~353	12		~464	36	153	387	56	98	~411	
Queue Length 95th (ft)		#534	62		#661	90	241	#675	143	155	#629	
Internal Link Dist (ft)		1600			962			2320			2200	
Turn Bay Length (ft)			125			75	150		150	150		

Lanes, Volumes, Timings

PM 2037 B

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		226	642		246	596	411	691	706	403	610	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		1.69	0.31		1.94	0.31	0.65	0.96	0.46	0.42	1.01	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 95.7

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø4
26 s	36 s	36 s
 Ø5	 Ø6	 Ø8
26 s	36 s	36 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Future Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected		0.99	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1838	1583		1820	1583	1787	1881	1599	1752	1805	
Flt Permitted		0.36	1.00		0.40	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		676	1583		736	1583	1787	1881	1599	1752	1805	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.96	0.96
Adj. Flow (vph)	104	278	199	224	253	183	268	660	323	170	529	88
RTOR Reduction (vph)	0	0	113	0	0	67	0	0	118	0	6	0
Lane Group Flow (vph)	0	382	86	0	477	116	268	660	205	170	611	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Actuated Green, G (s)		30.0	30.0		30.0	30.0	17.6	33.2	33.2	14.5	30.1	
Effective Green, g (s)		32.0	32.0		32.0	32.0	19.6	35.2	35.2	16.5	32.1	
Actuated g/C Ratio		0.33	0.33		0.33	0.33	0.20	0.37	0.37	0.17	0.34	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		226	529		246	529	365	691	588	302	605	
v/s Ratio Prot							c0.15	c0.35		0.10	0.34	
v/s Ratio Perm		0.57	0.05		c0.65	0.07			0.13			
v/c Ratio		1.69	0.16		1.94	0.22	0.73	0.96	0.35	0.56	1.01	
Uniform Delay, d1		31.9	22.4		31.9	22.9	35.6	29.5	21.9	36.3	31.8	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		329.0	0.1		437.2	0.2	7.5	23.6	0.4	2.4	39.1	
Delay (s)		360.9	22.6		469.0	23.1	43.1	53.0	22.3	38.7	70.9	
Level of Service		F	C		F	C	D	D	C	D	E	
Approach Delay (s)		245.0			345.4			43.0			63.9	
Approach LOS		F			F			D			E	
Intersection Summary												
HCM 2000 Control Delay			144.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.30									
Actuated Cycle Length (s)			95.7				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			100.1%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Future Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		75	90		0	150		150	150		150
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	75			100			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			878			825	
Travel Time (s)		38.2			23.7			20.0			18.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	278	199	224	436	0	268	983	0	170	617	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		4.0	8.0		4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	14.0		11.0	14.0	
Total Split (s)	14.0	28.0	28.0	17.0	31.0		20.0	30.0		15.0	25.0	
Total Split (%)	15.6%	31.1%	31.1%	18.9%	34.4%		22.2%	33.3%		16.7%	27.8%	
Maximum Green (s)	8.0	22.0	22.0	11.0	25.0		14.0	24.0		9.0	19.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
v/c Ratio	0.53	0.62	0.38	0.85	0.76		0.83	0.91		0.77	0.72	
Control Delay	48.2	35.7	7.7	66.6	35.8		58.6	41.1		61.9	35.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.2	35.7	7.7	66.6	35.8		58.6	41.1		61.9	35.7	
Queue Length 50th (ft)	57	136	7	126	206		149	262		95	167	
Queue Length 95th (ft)	109	216	59	#256	#356		#281	#391		#201	229	
Internal Link Dist (ft)		1600			962			798			745	
Turn Bay Length (ft)	75		75	90			150			150		

Lanes, Volumes, Timings
 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 B-MIT
 Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	203	513	568	264	583		328	1080		221	853	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.51	0.54	0.35	0.85	0.75		0.82	0.91		0.77	0.72	

Intersection Summary

Area Type: Other

Cycle Length: 90

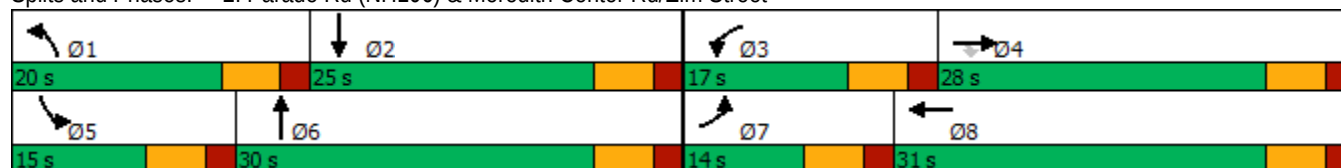
Actuated Cycle Length: 87.3

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street



HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

PM 2037 B-MIT
Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Future Volume (vph)	94	250	179	202	228	165	241	594	291	163	508	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1745		1787	3398		1752	3430	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1745		1787	3398		1752	3430	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.96	0.96	0.96
Adj. Flow (vph)	104	278	199	224	253	183	268	660	323	170	529	88
RTOR Reduction (vph)	0	0	136	0	28	0	0	66	0	0	14	0
Lane Group Flow (vph)	104	278	63	224	408	0	268	917	0	170	603	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	6.3	20.5	20.5	11.0	25.2		13.7	24.0		9.0	19.3	
Effective Green, g (s)	8.3	22.5	22.5	13.0	27.2		15.7	26.0		11.0	21.3	
Actuated g/C Ratio	0.09	0.25	0.25	0.15	0.31		0.18	0.29		0.12	0.24	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	166	473	402	260	536		317	998		217	825	
v/s Ratio Prot	0.06	0.15		c0.13	c0.23		c0.15	c0.27		0.10	0.18	
v/s Ratio Perm			0.04									
v/c Ratio	0.63	0.59	0.16	0.86	0.76		0.85	0.92		0.78	0.73	
Uniform Delay, d1	38.6	28.9	25.6	36.9	27.7		35.2	30.2		37.6	31.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.2	1.9	0.2	24.1	6.3		18.3	12.9		16.7	3.3	
Delay (s)	45.8	30.8	25.8	61.0	34.0		53.5	43.1		54.3	34.3	
Level of Service	D	C	C	E	C		D	D		D	C	
Approach Delay (s)		31.8			43.1			45.3			38.6	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			40.9			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			88.5			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			75.4%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	109	116	46	116	135	111	299	63	120	271	2
Future Volume (vph)	2	109	116	46	116	135	111	299	63	120	271	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		75	150		150	150		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			2400			2280	
Travel Time (s)		38.2			23.7			54.5			51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	123	129	0	180	150	123	332	70	133	303	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	14.0	14.0	11.0	14.0	
Total Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	26.0	36.0	36.0	26.0	36.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.5%	36.7%	36.7%	26.5%	36.7%	
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	30.0	20.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
v/c Ratio		0.25	0.25		0.40	0.28	0.31	0.52	0.12	0.33	0.47	
Control Delay		21.1	6.1		23.3	5.9	24.9	20.5	2.6	24.8	19.3	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		21.1	6.1		23.3	5.9	24.9	20.5	2.6	24.8	19.3	
Queue Length 50th (ft)		33	0		50	0	35	89	0	37	79	
Queue Length 95th (ft)		91	39		130	42	101	207	15	106	185	
Internal Link Dist (ft)		1600			962			2320			2200	
Turn Bay Length (ft)			125			75	150		150	150		

Lanes, Volumes, Timings

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 NB

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		1137	1020		1036	1056	786	1165	1028	786	1164	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.11	0.13		0.17	0.14	0.16	0.28	0.07	0.17	0.26	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 55.6

Natural Cycle: 40

Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø4
26 s	36 s	36 s
 Ø5	 Ø6	 Ø8
26 s	36 s	36 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	109	116	46	116	135	111	299	63	120	271	2
Future Volume (vph)	2	109	116	46	116	135	111	299	63	120	271	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00		0.99	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1825	1553		1855	1599	1770	1863	1583	1770	1861	
Flt Permitted		0.99	1.00		0.88	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1817	1553		1658	1599	1770	1863	1583	1770	1861	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	121	129	51	129	150	123	332	70	133	301	2
RTOR Reduction (vph)	0	0	95	0	0	110	0	0	46	0	0	0
Lane Group Flow (vph)	0	123	34	0	180	40	123	332	24	133	303	0
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Actuated Green, G (s)		12.8	12.8		12.8	12.8	7.9	16.8	16.8	8.1	17.0	
Effective Green, g (s)		14.8	14.8		14.8	14.8	9.9	18.8	18.8	10.1	19.0	
Actuated g/C Ratio		0.27	0.27		0.27	0.27	0.18	0.34	0.34	0.18	0.34	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		482	412		440	424	314	628	534	320	634	
v/s Ratio Prot							0.07	c0.18		c0.08	0.16	
v/s Ratio Perm		0.07	0.02		c0.11	0.02			0.01			
v/c Ratio		0.26	0.08		0.41	0.09	0.39	0.53	0.04	0.42	0.48	
Uniform Delay, d1		16.1	15.4		16.8	15.4	20.2	14.9	12.4	20.2	14.4	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.3	0.1		0.6	0.1	0.8	0.8	0.0	0.9	0.6	
Delay (s)		16.4	15.4		17.5	15.5	21.0	15.7	12.4	21.1	15.0	
Level of Service		B	B		B	B	C	B	B	C	B	
Approach Delay (s)		15.9			16.6			16.5			16.9	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			16.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			55.7				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			47.7%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 B

Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Future Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		75	150		150	150		0
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			2400			2280	
Travel Time (s)		38.2			23.7			54.5			51.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	315	129	0	376	150	123	438	168	133	522	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Detector Phase	4	4	4	8	8	8	1	6	6	5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	4.0	8.0	8.0	4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	14.0	14.0	11.0	14.0	
Total Split (s)	36.0	36.0	36.0	36.0	36.0	36.0	26.0	36.0	36.0	26.0	36.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	36.7%	36.7%	26.5%	36.7%	36.7%	26.5%	36.7%	
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	20.0	30.0	30.0	20.0	30.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	
v/c Ratio		0.82	0.20		0.97	0.23	0.45	0.70	0.27	0.47	0.84	
Control Delay		46.4	5.0		69.9	9.5	39.9	32.8	6.6	39.9	39.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		46.4	5.0		69.9	9.5	39.9	32.8	6.6	39.9	39.9	
Queue Length 50th (ft)		161	0		209	18	64	206	8	70	255	
Queue Length 95th (ft)		#342	38		#427	64	118	338	53	125	#453	
Internal Link Dist (ft)		1600			962			2320			2200	
Turn Bay Length (ft)			125			75	150		150	150		

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		384	653		388	652	448	686	675	448	678	
Starvation Cap Reductn		0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	0	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.82	0.20		0.97	0.23	0.27	0.64	0.25	0.30	0.77	

Intersection Summary

Area Type: Other

Cycle Length: 98

Actuated Cycle Length: 87.4

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø4
26 s	36 s	36 s
 Ø5	 Ø6	 Ø8
26 s	36 s	36 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Future Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.98	1.00		0.98	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1797	1553		1843	1599	1770	1863	1583	1770	1803	
Flt Permitted		0.57	1.00		0.56	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1046	1553		1055	1599	1770	1863	1583	1770	1803	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	209	129	154	222	150	123	438	168	133	411	111
RTOR Reduction (vph)	0	0	81	0	0	63	0	0	97	0	10	0
Lane Group Flow (vph)	0	315	48	0	376	87	123	438	71	133	512	0
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8		8			6			
Actuated Green, G (s)		30.2	30.2		30.2	30.2	11.4	27.2	27.2	11.9	27.7	
Effective Green, g (s)		32.2	32.2		32.2	32.2	13.4	29.2	29.2	13.9	29.7	
Actuated g/C Ratio		0.37	0.37		0.37	0.37	0.15	0.33	0.33	0.16	0.34	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		385	572		389	589	271	623	529	281	613	
v/s Ratio Prot							0.07	0.24		c0.08	c0.28	
v/s Ratio Perm		0.30	0.03		c0.36	0.05			0.04			
v/c Ratio		0.82	0.08		0.97	0.15	0.45	0.70	0.13	0.47	0.84	
Uniform Delay, d1		24.9	17.9		27.0	18.4	33.6	25.3	20.2	33.4	26.5	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		12.7	0.1		36.5	0.1	1.2	3.6	0.1	1.3	9.6	
Delay (s)		37.6	18.0		63.6	18.5	34.8	28.9	20.4	34.6	36.2	
Level of Service		D	B		E	B	C	C	C	C	D	
Approach Delay (s)		31.9			50.7			27.9			35.8	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			36.0									
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			87.3									
Intersection Capacity Utilization			78.4%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Future Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	75		75	90		0	150		150	150		150
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	75			100			150			150		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1680			1042			878			825	
Travel Time (s)		38.2			23.7			20.0			18.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	209	129	154	372	0	123	606	0	133	522	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Detector Phase	7	4	4	3	8		1	6		5	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		4.0	8.0		4.0	8.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	14.0		11.0	14.0	
Total Split (s)	19.0	39.0	39.0	22.0	42.0		19.0	39.0		20.0	40.0	
Total Split (%)	15.8%	32.5%	32.5%	18.3%	35.0%		15.8%	32.5%		16.7%	33.3%	
Maximum Green (s)	13.0	33.0	33.0	16.0	36.0		13.0	33.0		14.0	34.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
v/c Ratio	0.45	0.47	0.27	0.53	0.65		0.49	0.65		0.51	0.55	
Control Delay	48.9	35.1	6.5	47.7	34.6		49.5	33.0		48.9	31.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.9	35.1	6.5	47.7	34.6		49.5	33.0		48.9	31.1	
Queue Length 50th (ft)	59	106	0	86	187		69	159		74	135	
Queue Length 95th (ft)	137	201	41	184	335		156	256		165	220	
Internal Link Dist (ft)		1600			962			798			745	
Turn Bay Length (ft)	75		75	90			150			150		

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)	294	722	696	363	776		299	1369		320	1410	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.36	0.29	0.19	0.42	0.48		0.41	0.44		0.42	0.37	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 93.3

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Splits and Phases: 2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

 Ø1	 Ø2	 Ø3	 Ø4
19 s	40 s	22 s	39 s
 Ø5	 Ø6	 Ø7	 Ø8
20 s	39 s	19 s	42 s

HCM Signalized Intersection Capacity Analysis

2: Parade Rd (NH106) & Meredith Center Rd/Elm Street

SAT 2037 B-MIT

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Future Volume (vph)	95	188	116	139	200	135	111	394	151	120	370	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1827	1553	1787	1767		1770	3392		1770	3426	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	1827	1553	1787	1767		1770	3392		1770	3426	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	106	209	129	154	222	150	123	438	168	133	411	111
RTOR Reduction (vph)	0	0	95	0	21	0	0	35	0	0	21	0
Lane Group Flow (vph)	106	209	34	154	351	0	123	571	0	133	501	0
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4									
Actuated Green, G (s)	8.6	22.7	22.7	12.9	27.0		11.1	22.5		11.7	23.1	
Effective Green, g (s)	10.6	24.7	24.7	14.9	29.0		13.1	24.5		13.7	25.1	
Actuated g/C Ratio	0.11	0.26	0.26	0.16	0.31		0.14	0.26		0.15	0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	196	481	408	283	546		247	885		258	916	
v/s Ratio Prot	0.06	0.11		c0.09	c0.20		0.07	c0.17		c0.08	0.15	
v/s Ratio Perm			0.02									
v/c Ratio	0.54	0.43	0.08	0.54	0.64		0.50	0.65		0.52	0.55	
Uniform Delay, d1	39.3	28.7	26.0	36.3	27.9		37.3	30.8		37.0	29.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.6	0.1	2.1	2.6		1.6	1.6		1.7	0.7	
Delay (s)	42.3	29.4	26.1	38.5	30.5		38.9	32.4		38.7	30.1	
Level of Service	D	C	C	D	C		D	C		D	C	
Approach Delay (s)		31.5			32.9			33.5			31.9	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			32.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			93.8			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			59.7%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

LEVEL OF SERVICE

Lane Level of Service



Site: [2] 2-Parade_Meredith_Elm (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

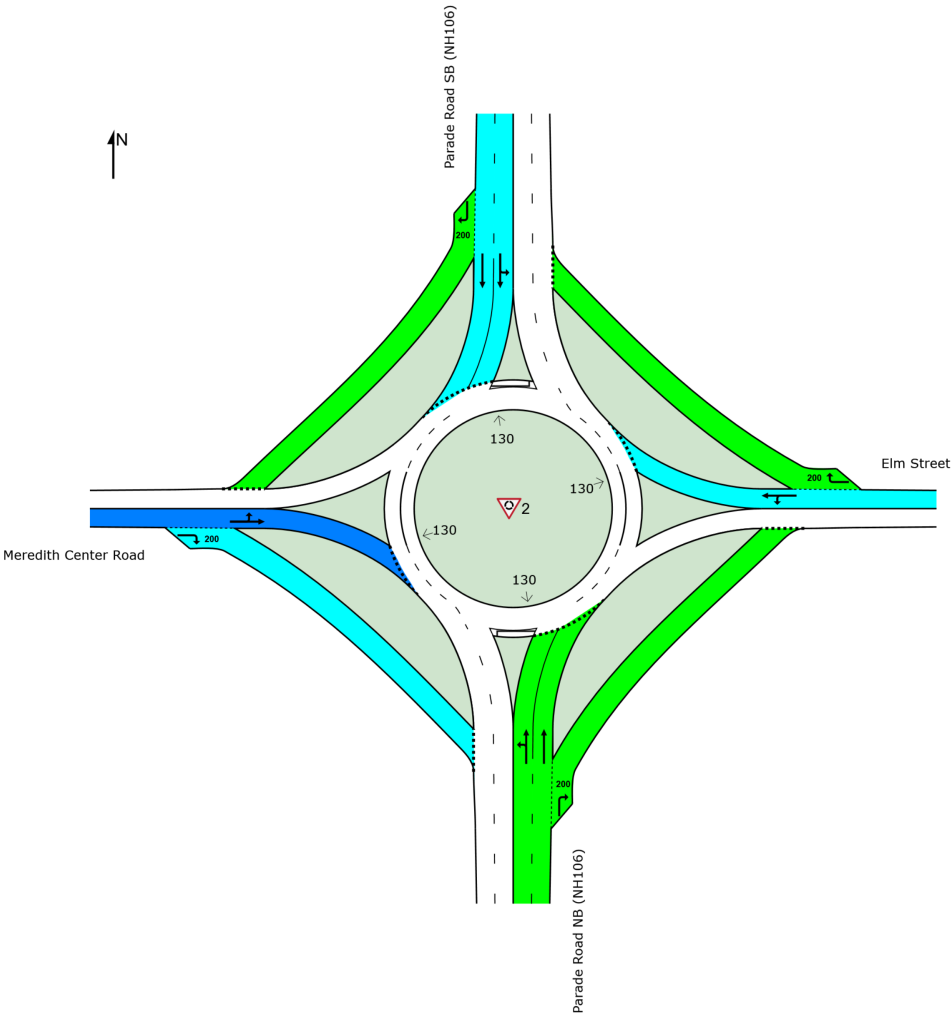
New Site

Site Category: (None)

Roundabout

Site Scenario: 2 | AM 2037 BUILD

	Approaches				Intersection
	South	East	North	West	
LOS	A	B	A	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:03:37 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [2] 2-Parade_Meredith_Elm (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 2 | AM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	[Dist] ft				mph
South: Parade Road NB (NH106)															
3	L2	All MCs	166	6.0	166	6.0	0.397	9.3	LOS A	1.9	51.0	0.62	0.53	0.71	30.4
8	T1	All MCs	476	6.0	476	6.0	0.397	9.3	LOS A	1.9	51.0	0.62	0.53	0.71	32.0
18	R2	All MCs	202	6.0	202	6.0	0.247	7.0	LOS A	1.1	27.9	0.56	0.42	0.56	32.8
Approach			843	6.0	843	6.0	0.397	8.7	LOS A	1.9	51.0	0.61	0.51	0.68	31.8
East: Elm Street															
1	L2	All MCs	156	5.0	156	5.0	0.521	13.6	LOS B	2.9	75.4	0.72	0.78	1.09	28.9
6	T1	All MCs	192	5.0	192	5.0	0.521	13.6	LOS B	2.9	75.4	0.72	0.78	1.09	29.6
16	R2	All MCs	133	5.0	133	5.0	0.169	6.3	LOS A	0.6	15.3	0.52	0.44	0.52	33.3
Approach			481	5.0	481	5.0	0.521	11.6	LOS B	2.9	75.4	0.67	0.68	0.93	30.2
North: Parade Road SB (NH106)															
7	L2	All MCs	181	2.0	181	2.0	0.469	10.3	LOS B	2.9	73.1	0.67	0.62	0.87	30.2
4	T1	All MCs	606	2.0	606	2.0	0.469	10.3	LOS B	2.9	73.1	0.67	0.62	0.87	31.6
14	R2	All MCs	84	2.0	84	2.0	0.092	4.8	LOS A	0.4	9.7	0.47	0.34	0.47	34.0
Approach			871	2.0	871	2.0	0.469	9.8	LOS A	2.9	73.1	0.65	0.59	0.84	31.5
West: Meredith Center Road															
5	L2	All MCs	78	3.0	78	3.0	0.553	16.3	LOS C	2.9	75.2	0.76	0.87	1.19	28.4
2	T1	All MCs	241	3.0	241	3.0	0.553	16.3	LOS C	2.9	75.2	0.76	0.87	1.19	29.0
12	R2	All MCs	293	3.0	293	3.0	0.429	11.3	LOS B	2.1	53.3	0.68	0.70	0.91	31.0
Approach			612	3.0	612	3.0	0.553	13.9	LOS B	2.9	75.2	0.72	0.79	1.05	29.8
All Vehicles			2808	3.9	2808	3.9	0.553	10.7	LOS B	2.9	75.4	0.66	0.62	0.85	31.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:03:37 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [2] 2-Parade_Meredith_Elm (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

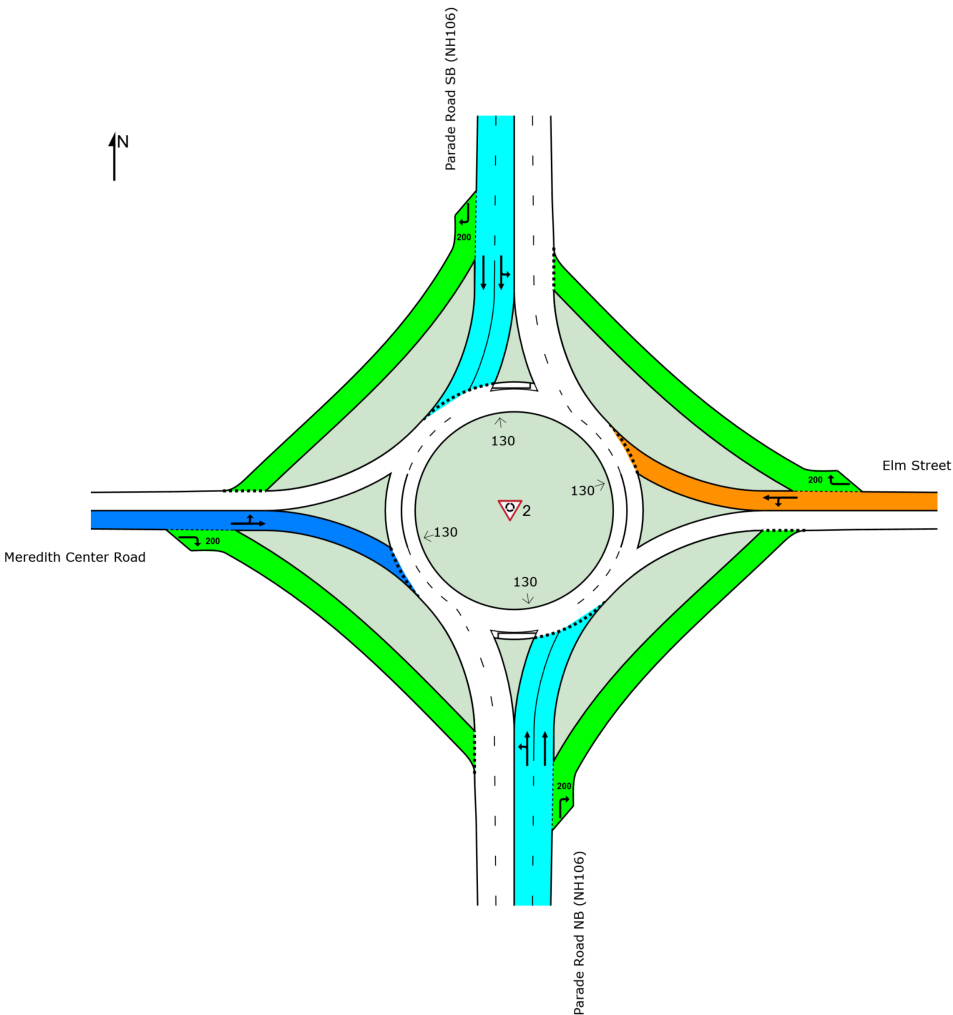
New Site

Site Category: (None)

Roundabout

Site Scenario: 3 | PM 2037 BUILD

	Approaches				Intersection
	South	East	North	West	
LOS	B	D	B	C	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:06:55 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [2] 2-Parade_Meredith_Elm (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 3 | PM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]	ft			mph
South: Parade Road NB (NH106)															
3	L2	All MCs	268	1.0	268	1.0	0.562	12.5	LOS B	4.2	107.0	0.74	0.74	1.10	29.1
8	T1	All MCs	660	1.0	660	1.0	0.562	12.5	LOS B	4.2	107.0	0.74	0.74	1.10	30.7
18	R2	All MCs	323	1.0	323	1.0	0.384	8.8	LOS A	2.0	49.9	0.64	0.51	0.66	32.0
Approach			1251	1.0	1251	1.0	0.562	11.5	LOS B	4.2	107.0	0.71	0.68	0.99	30.7
East: Elm Street															
1	L2	All MCs	224	2.0	224	2.0	0.866	38.7	LOS E	8.5	215.2	0.91	1.34	2.34	22.1
6	T1	All MCs	253	2.0	253	2.0	0.866	38.7	LOS E	8.5	215.2	0.91	1.34	2.34	22.4
16	R2	All MCs	183	2.0	183	2.0	0.261	8.2	LOS A	1.0	24.6	0.61	0.56	0.61	32.4
Approach			661	2.0	661	2.0	0.866	30.2	LOS D	8.5	215.2	0.83	1.12	1.86	24.3
North: Parade Road SB (NH106)															
7	L2	All MCs	181	3.0	181	3.0	0.557	14.6	LOS B	3.5	88.9	0.76	0.82	1.16	28.5
4	T1	All MCs	564	3.0	564	3.0	0.557	14.6	LOS B	3.5	88.9	0.76	0.82	1.16	29.9
14	R2	All MCs	93	3.0	93	3.0	0.121	5.9	LOS A	0.5	12.4	0.55	0.45	0.55	33.4
Approach			839	3.0	839	3.0	0.557	13.6	LOS B	3.5	88.9	0.74	0.78	1.09	29.9
West: Meredith Center Road															
5	L2	All MCs	104	2.0	104	2.0	0.664	20.8	LOS C	4.2	107.3	0.81	0.99	1.44	26.9
2	T1	All MCs	278	2.0	278	2.0	0.664	20.8	LOS C	4.2	107.3	0.81	0.99	1.44	27.4
12	R2	All MCs	199	2.0	199	2.0	0.292	8.9	LOS A	1.1	28.1	0.63	0.59	0.64	32.1
Approach			581	2.0	581	2.0	0.664	16.7	LOS C	4.2	107.3	0.75	0.85	1.16	28.7
All Vehicles			3332	1.9	3332	1.9	0.866	16.7	LOS C	8.5	215.2	0.75	0.82	1.22	28.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:06:55 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [2] 2-Parade_Meredith_Elm (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

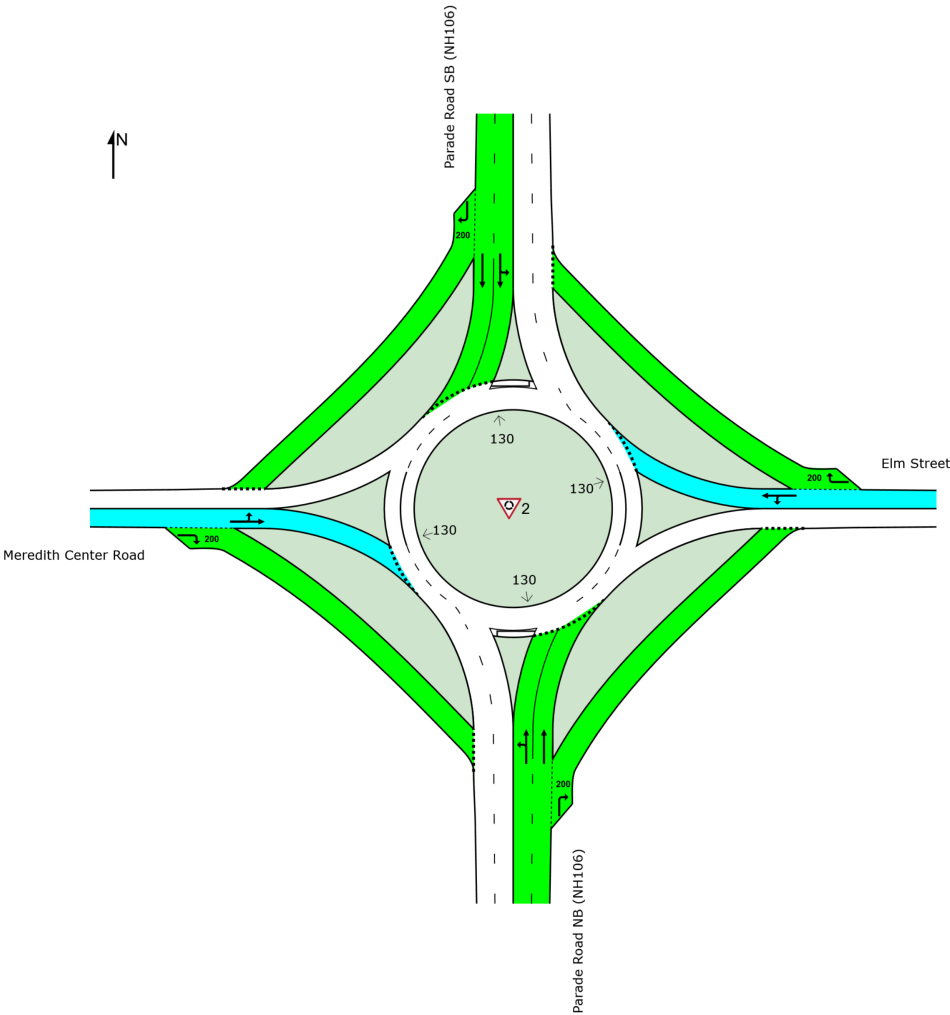
New Site

Site Category: (None)

Roundabout

Site Scenario: 4 | SAT 2037 BUILD

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:07:23 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [2] 2-Parade_Meredith_Elm (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 4 | SAT 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist]				mph
			veh/h		veh/h		v/c	sec			ft				
South: Parade Road NB (NH106)															
3	L2	All MCs	123	2.0	123	2.0	0.311	7.3	LOS A	1.4	35.1	0.56	0.43	0.56	31.5
8	T1	All MCs	438	2.0	438	2.0	0.311	7.3	LOS A	1.4	35.1	0.56	0.43	0.56	33.0
18	R2	All MCs	168	2.0	168	2.0	0.179	5.5	LOS A	0.8	20.1	0.49	0.35	0.49	33.6
Approach			729	2.0	729	2.0	0.311	6.9	LOS A	1.4	35.1	0.54	0.41	0.54	32.9
East: Elm Street															
1	L2	All MCs	154	1.0	154	1.0	0.484	11.2	LOS B	2.8	71.6	0.69	0.70	0.97	30.0
6	T1	All MCs	222	1.0	222	1.0	0.484	11.2	LOS B	2.8	71.6	0.69	0.70	0.97	30.6
16	R2	All MCs	150	1.0	150	1.0	0.173	5.9	LOS A	0.7	16.4	0.51	0.42	0.51	33.6
Approach			527	1.0	527	1.0	0.484	9.7	LOS A	2.8	71.6	0.64	0.62	0.84	31.2
North: Parade Road SB (NH106)															
7	L2	All MCs	133	2.0	133	2.0	0.314	7.6	LOS A	1.4	35.0	0.58	0.46	0.58	31.2
4	T1	All MCs	411	2.0	411	2.0	0.314	7.6	LOS A	1.4	35.0	0.58	0.46	0.58	32.9
14	R2	All MCs	111	2.0	111	2.0	0.118	4.9	LOS A	0.5	12.7	0.46	0.33	0.46	33.9
Approach			656	2.0	656	2.0	0.314	7.1	LOS A	1.4	35.0	0.56	0.44	0.56	32.7
West: Meredith Center Road															
5	L2	All MCs	106	4.0	106	4.0	0.441	11.1	LOS B	2.2	57.4	0.67	0.68	0.91	30.1
2	T1	All MCs	209	4.0	209	4.0	0.441	11.1	LOS B	2.2	57.4	0.67	0.68	0.91	30.8
12	R2	All MCs	129	4.0	129	4.0	0.159	6.1	LOS A	0.6	14.5	0.52	0.43	0.52	33.4
Approach			443	4.0	443	4.0	0.441	9.6	LOS A	2.2	57.4	0.63	0.61	0.80	31.3
All Vehicles			2354	2.2	2354	2.2	0.484	8.1	LOS A	2.8	71.6	0.59	0.50	0.66	32.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:07:23 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [2 (2)] 2-Parade_Meredith_Elm_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

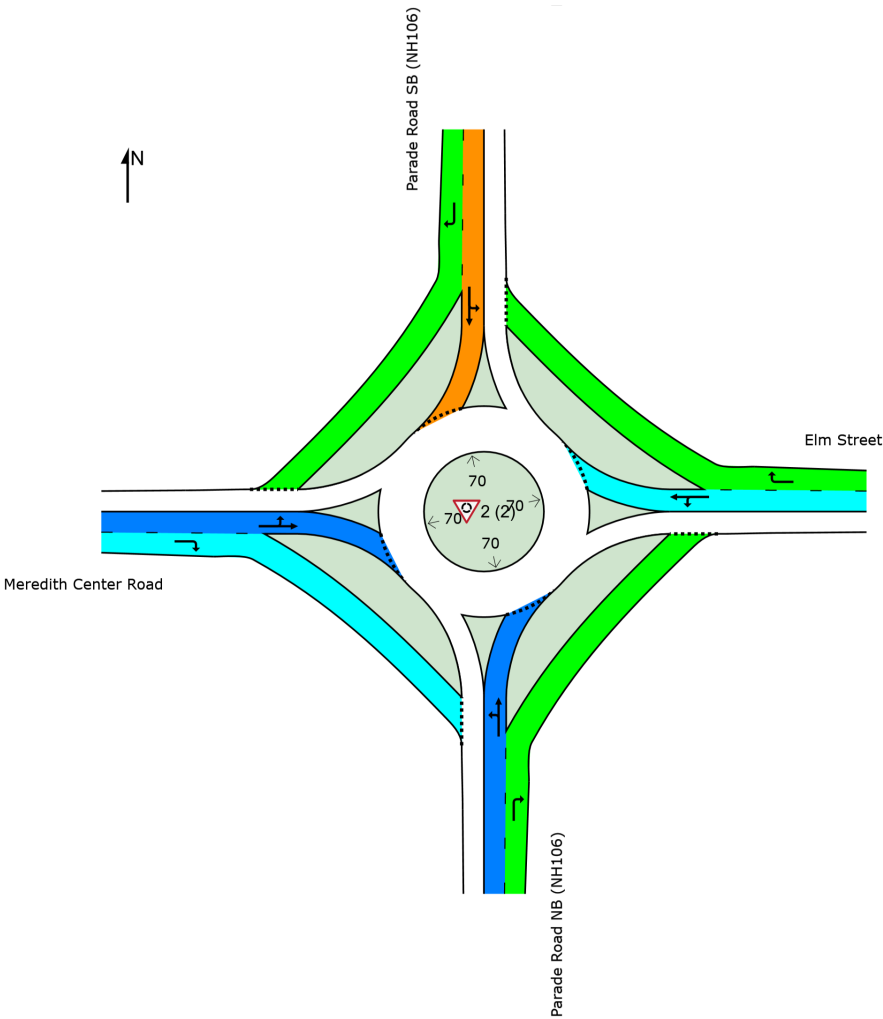
New Site

Site Category: (None)

Roundabout

Site Scenario: 2 | AM 2037 BUILD

	Approaches				Intersection
	South	East	North	West	
LOS	C	B	E	C	C



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:07:45 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [2 (2)] 2-Parade_Meredith_Elm_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 2 | AM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist]				
			veh/h		veh/h		v/c	sec			ft				mph
South: Parade Road NB (NH106)															
3	L2	All MCs	166	6.0	166	6.0	0.794	22.7	LOS C	11.1	291.6	0.93	1.13	1.95	25.7
8	T1	All MCs	476	6.0	476	6.0	0.794	22.7	LOS C	11.1	291.6	0.93	1.13	1.95	26.1
18	R2	All MCs	202	6.0	202	6.0	0.247	7.0	LOS A	1.1	27.9	0.56	0.42	0.56	32.2
Approach			843	6.0	843	6.0	0.794	19.0	LOS C	11.1	291.6	0.84	0.96	1.62	27.2
East: Elm Street															
1	L2	All MCs	156	5.0	156	5.0	0.542	14.6	LOS B	3.1	80.7	0.75	0.80	1.11	28.0
6	T1	All MCs	192	5.0	192	5.0	0.542	14.6	LOS B	3.1	80.7	0.75	0.80	1.11	28.5
16	R2	All MCs	133	5.0	133	5.0	0.189	7.2	LOS A	0.8	19.5	0.60	0.50	0.60	32.1
Approach			481	5.0	481	5.0	0.542	12.6	LOS B	3.1	80.7	0.71	0.72	0.97	29.2
North: Parade Road SB (NH106)															
7	L2	All MCs	181	2.0	181	2.0	0.938	38.4	LOS E	22.9	581.4	1.00	1.68	3.09	21.9
4	T1	All MCs	606	2.0	606	2.0	0.938	38.4	LOS E	22.9	581.4	1.00	1.68	3.09	22.2
14	R2	All MCs	84	2.0	84	2.0	0.092	4.8	LOS A	0.4	9.7	0.47	0.34	0.47	33.4
Approach			871	2.0	871	2.0	0.938	35.2	LOS E	22.9	581.4	0.95	1.55	2.83	22.8
West: Meredith Center Road															
5	L2	All MCs	78	3.0	78	3.0	0.583	18.1	LOS C	3.1	80.5	0.79	0.89	1.18	27.2
2	T1	All MCs	241	3.0	241	3.0	0.583	18.1	LOS C	3.1	80.5	0.79	0.89	1.18	27.6
12	R2	All MCs	293	3.0	293	3.0	0.498	14.4	LOS B	2.8	71.1	0.77	0.80	1.06	29.1
Approach			612	3.0	612	3.0	0.583	16.3	LOS C	3.1	80.5	0.78	0.85	1.12	28.3
All Vehicles			2808	3.9	2808	3.9	0.938	22.3	LOS C	22.9	581.4	0.84	1.08	1.77	26.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:07:45 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [2 (2)] 2-Parade_Meredith_Elm_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

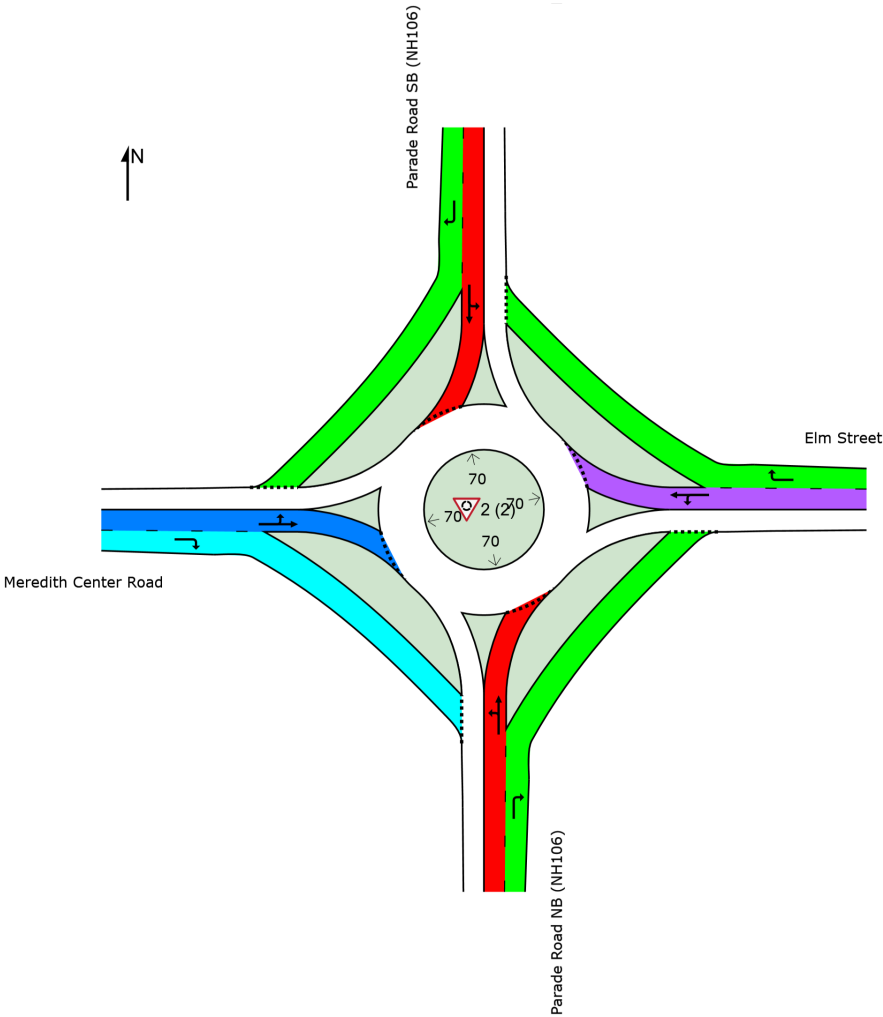
New Site

Site Category: (None)

Roundabout

Site Scenario: 3 | PM 2037 BUILD

	Approaches				Intersection
	South	East	North	West	
LOS	F	D	F	C	F



Colour code based on Level of Service

LOS A	LOS B	LOS C	LOS D	LOS E	LOS F
-------	-------	-------	-------	-------	-------

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:08:21 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [2 (2)] 2-Parade_Meredith_Elm_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 3 | PM 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] ft				mph
South: Parade Road NB (NH106)															
3	L2	All MCs	268	1.0	268	1.0	1.107	82.7	LOS F	50.1	1263.6	1.00	2.78	5.91	15.3
8	T1	All MCs	660	1.0	660	1.0	1.107	82.7	LOS F	50.1	1263.6	1.00	2.78	5.91	15.5
18	R2	All MCs	323	1.0	323	1.0	0.377	8.5	LOS A	1.9	48.2	0.63	0.49	0.63	31.6
Approach			1251	1.0	1251	1.0	1.107	63.5	LOS F	50.1	1263.6	0.90	2.18	4.55	17.7
East: Elm Street															
1	L2	All MCs	224	2.0	224	2.0	0.837	34.2	LOS D	7.6	193.1	0.92	1.21	1.98	22.6
6	T1	All MCs	253	2.0	253	2.0	0.837	34.2	LOS D	7.6	193.1	0.92	1.21	1.98	22.9
16	R2	All MCs	183	2.0	183	2.0	0.282	9.0	LOS A	1.2	30.3	0.67	0.60	0.67	31.4
Approach			661	2.0	661	2.0	0.837	27.3	LOS D	7.6	193.1	0.85	1.04	1.61	24.6
North: Parade Road SB (NH106)															
7	L2	All MCs	181	3.0	181	3.0	1.084	81.0	LOS F	35.4	906.9	1.00	2.54	5.64	15.5
4	T1	All MCs	564	3.0	564	3.0	1.084	81.0	LOS F	35.4	906.9	1.00	2.54	5.64	15.6
14	R2	All MCs	93	3.0	93	3.0	0.118	5.7	LOS A	0.5	12.1	0.54	0.43	0.54	32.9
Approach			839	3.0	839	3.0	1.084	72.6	LOS F	35.4	906.9	0.95	2.31	5.07	16.6
West: Meredith Center Road															
5	L2	All MCs	104	2.0	104	2.0	0.658	20.3	LOS C	4.3	108.0	0.82	0.96	1.36	26.5
2	T1	All MCs	278	2.0	278	2.0	0.658	20.3	LOS C	4.3	108.0	0.82	0.96	1.36	26.9
12	R2	All MCs	199	2.0	199	2.0	0.324	10.2	LOS B	1.4	36.3	0.69	0.65	0.75	30.9
Approach			581	2.0	581	2.0	0.658	16.8	LOS C	4.3	108.0	0.78	0.86	1.15	28.0
All Vehicles			3332	1.9	3332	1.9	1.107	50.5	LOS F	50.1	1263.6	0.88	1.76	3.50	19.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:08:21 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

LEVEL OF SERVICE

Lane Level of Service



Site: [2 (2)] 2-Parade_Meredith_Elm_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

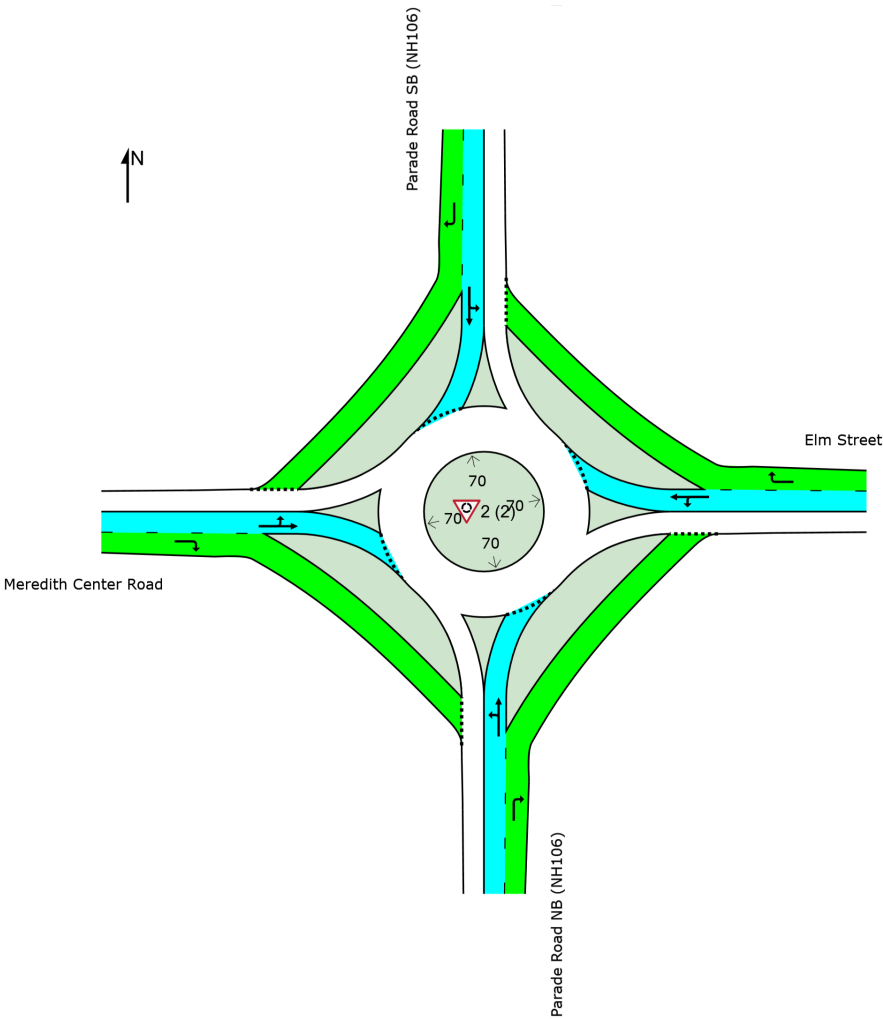
New Site

Site Category: (None)

Roundabout

Site Scenario: 4 | SAT 2037 BUILD

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	B	B



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab). LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:08:47 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [2 (2)] 2-Parade_Meredith_Elm_r1 (Front Door)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 4 | SAT 2037 BUILD

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist]				
			veh/h		veh/h		v/c	sec			ft				mph
South: Parade Road NB (NH106)															
3	L2	All MCs	123	2.0	123	2.0	0.622	13.2	LOS B	6.0	151.7	0.75	0.75	1.19	29.0
8	T1	All MCs	438	2.0	438	2.0	0.622	13.2	LOS B	6.0	151.7	0.75	0.75	1.19	29.4
18	R2	All MCs	168	2.0	168	2.0	0.179	5.5	LOS A	0.8	20.1	0.49	0.35	0.49	33.0
Approach			729	2.0	729	2.0	0.622	11.5	LOS B	6.0	151.7	0.69	0.66	1.03	30.1
East: Elm Street															
1	L2	All MCs	154	1.0	154	1.0	0.503	12.0	LOS B	3.1	78.2	0.72	0.73	1.01	29.1
6	T1	All MCs	222	1.0	222	1.0	0.503	12.0	LOS B	3.1	78.2	0.72	0.73	1.01	29.6
16	R2	All MCs	150	1.0	150	1.0	0.195	6.7	LOS A	0.8	20.9	0.59	0.49	0.59	32.4
Approach			527	1.0	527	1.0	0.503	10.5	LOS B	3.1	78.2	0.68	0.66	0.89	30.2
North: Parade Road SB (NH106)															
7	L2	All MCs	133	2.0	133	2.0	0.628	13.9	LOS B	5.9	149.0	0.77	0.79	1.24	28.7
4	T1	All MCs	411	2.0	411	2.0	0.628	13.9	LOS B	5.9	149.0	0.77	0.79	1.24	29.1
14	R2	All MCs	111	2.0	111	2.0	0.118	4.9	LOS A	0.5	12.7	0.46	0.33	0.46	33.3
Approach			656	2.0	656	2.0	0.628	12.3	LOS B	5.9	149.0	0.72	0.71	1.11	29.7
West: Meredith Center Road															
5	L2	All MCs	106	4.0	106	4.0	0.458	11.8	LOS B	2.4	62.6	0.70	0.71	0.95	29.2
2	T1	All MCs	209	4.0	209	4.0	0.458	11.8	LOS B	2.4	62.6	0.70	0.71	0.95	29.7
12	R2	All MCs	129	4.0	129	4.0	0.178	6.9	LOS A	0.7	18.5	0.59	0.49	0.59	32.3
Approach			443	4.0	443	4.0	0.458	10.4	LOS B	2.4	62.6	0.67	0.65	0.85	30.3
All Vehicles			2354	2.2	2354	2.2	0.628	11.3	LOS B	6.0	151.7	0.69	0.67	0.99	30.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 11:08:47 AM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

ATTACHMENT K (Updated Rev1)

Aerial Intersection Overlays

#3 Parade Rd at Right Way Path/Old Main - Roundabout

#2 Parade Rd at Meredith/Elm – Signal

#2 Parade Rd at Meredith/Elm – Roundabout

#3 - Parade Road at Right Way Path / Old North Main St / Ahern Park

OVERALL LOS

2037 No-Build

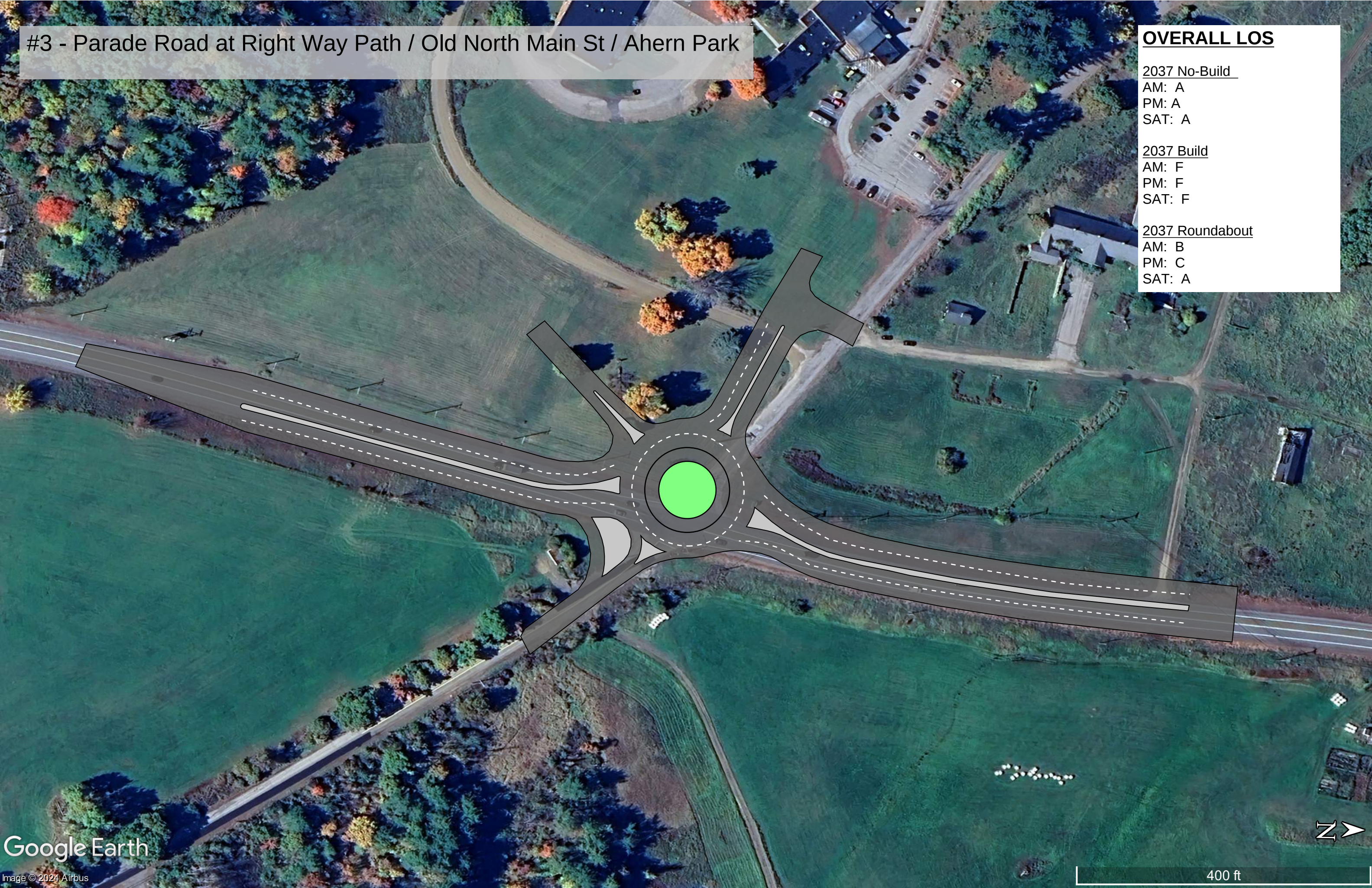
AM: A
PM: A
SAT: A

2037 Build

AM: F
PM: F
SAT: F

2037 Roundabout

AM: B
PM: C
SAT: A



#2 Parade Rd at Meredith Center Rd / Elm St

NB (40mph)
STORAGE LANE: 335'
TRANSITION: 75'
TURN TAPER: 75'
LANE TAPER: 320' (12' LANE)

SB (40mph)
STORAGE LANE: 345'
TRANSITION: 75'
TURN TAPER: 75'
LANE TAPER: 320' (12' LANE)

EB (40mph)
STORAGE LANE: 245'
TRANSITION: 75'
TURN TAPER: 75'
LANE TAPER: 320' (12' LANE)

WB (30mph)
STORAGE LANE: 160'
TRANSITION: 75'
TURN TAPER: 0
LANE TAPER: 180' (12' LANE)

OVERALL LOS

2037 No-Build
AM: C
PM: C
SAT: B

2037 Build
AM: D
PM: F
SAT: D

2037 Signal
AM: D
PM: D
SAT: C



#2 Parade Rd at Meredith Center Rd / Elm St

OVERALL LOS

2037 No-Build

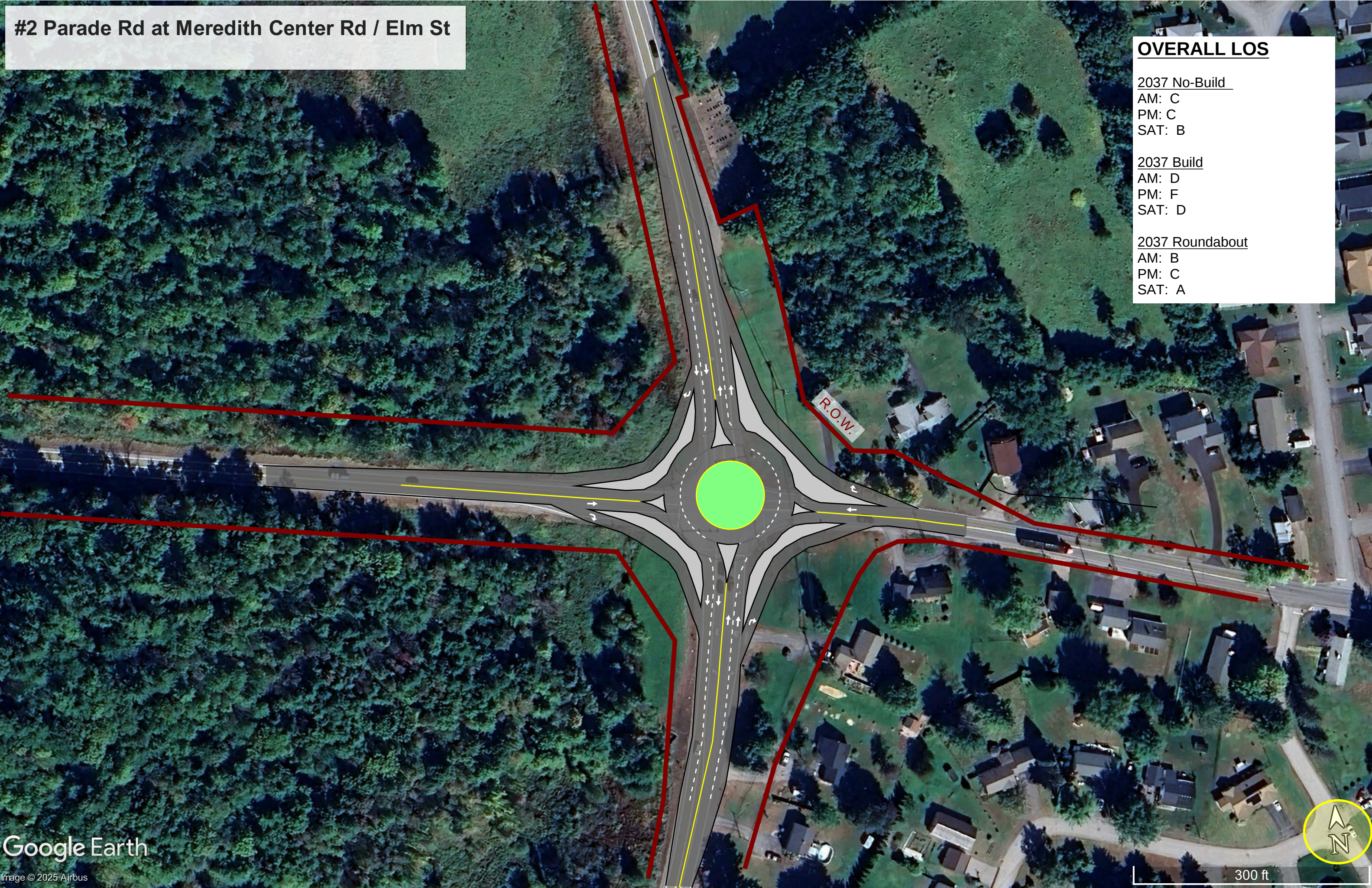
AM: C
PM: C
SAT: B

2037 Build

AM: D
PM: F
SAT: D

2037 Roundabout

AM: B
PM: C
SAT: A



Part B (Updated Rev1)

City Intersection Analysis



Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

Full-Build City Intersection Analysis– Part B

Introduction

This section focuses on Part B intersections under City control, listed below.



Part B - City Intersections:

14. North Main St at Lexington Dr	page 3 to 8
15. North Main St at Oak St	page 9 to 13
19. Main St at New Salem St	page 14 to 20
16. North Main St at Church St	page 21 to 25
17. North Main St at Union Ave/Court St	page 26 to 30
20. Court St at Fair St	page 31 to 35
13. Union Ave at Elm St/Clinton St	page 36 to 40
18. Union Ave at Gilford Ave	page 41 to 45
21. Union Ave at Church St/Winter St/Davis Pl	page 46 to 50

TFMoran, Inc.

48 Constitution Drive, Bedford, NH 03110
T(603) 472-4488 F(603) 472-9747 www.tfmoran.com

MSC a division of TFMoran, Inc.

170 Commerce Way – Suite 102, Portsmouth, NH 03801
T(603) 431-2222 F(603) 431-0910 www.msceengineers.com

Intersection Summaries

For each study area intersection, a map, brief description, and 2037 peak hour volume diagrams are provided below, followed by a summary of operational results and discussion of proposed mitigation strategies.

Methodology.

Trafficware “Synchro” v11 software (based on HCM 2000) was used to analyze signalized and unsignalized intersections during AM, PM and SAT peak hours. Roundabouts were analyzed using SIDRA INTERSECTION 10.

Level of Service (LOS)

The relationship between control delay and LOS is shown in the following table.

Level of Service (LOS)	A	B	C	D	E	F
Signalized Control Delay (sec)	≤10.0	10.1 to 20.0	20.1 to 35.0	35.1 to 55.0	55.1 to 80.0	Over 80.0
Unsignalized Control Delay (sec)	≤10.0	10.1 to 15.0	15.1 to 25.0	25.1 to 35.0	35.1 to 50.0	Over 50.0

Queue Analysis.

Vehicle queue lengths are reported for each intersection approach’s longest length at the 95th percentile in feet.

Volume to Capacity (v/c) ratios

The ratios of traffic volume for each approach within an intersection and the theoretical capacity of that approach are reported as a decimal. Also reported is the overall v/c ratio for the intersection.

Summary Tables

LOS, delays, queues, and v/c ratios are presented for each intersection overall and for each approach within each intersection in the summary tables in the following section.

Intersection #14: Parade Rd (NH106) / N.Main St at Lexington Dr

Existing Conditions

This is an existing 3-way stop controlled intersection. Parade Road (NH106) forms the NB approach, N.Main Street forms the SB approach and Lexington Drive forms the EB approach.

Lexington Drive serves an industrial park and single family homes along Shore Drive.

Each approach accommodates two-way traffic. The NB approach has an exclusive left-turn lane and a thru lane where SB has a single lane approach. EB has both a left-turn lane and a right-turn lane each of about 900 feet in length.

The posted speed limit is 35 mph on Parade Road/N.Main Street and 30 mph on Lexington Drive. There are cobra-head street lights on the east side of NH106 directly across from Lexington Drive and on a utility pole at the northwest corner of the intersection. There are no pedestrian facilities.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience is low at 1 crash per year.

Crash Data Summary Intersection #14: Parade Rd (NH106) at Lexington Dr

CRASH FREQUENCY	
Total Crashes	4
Crashes per Year (Avg)	1
CRASH SEVERITY	
Property Damage Only	3
Injury	1
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	0
Other Motor Vehicle	4
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	1
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	1
Non-Commuter Peak	3



AM Total Site Trips

62	328	Parade Rd
↑	↓	
Lexington Dr		
67	↑	
0	↓	
N Main Street	↑	↑
	0	198

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

<u>39</u>	<u>280</u>	Parade Rd
23	41	
↑	↓	
Lexington Dr		
<u>12</u>	55	↑
<u>0</u>	0	↓
N Main Street	↑	↑
	0	99
	<u>0</u>	<u>88</u>
		<u>11</u>

PM Total Site Trips

74	343	Parade Rd
↑	↓	
Lexington Dr		
65	↑	
0	↓	
N Main Street	↑	↑
	0	363

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

<u>19</u>	<u>134</u>	Parade Rd
55	155	
↑	↓	
Lexington Dr		
<u>29</u>	36	↑
<u>0</u>	0	↓
N Main Street	↑	↑
	0	101
	<u>0</u>	<u>210</u>
		<u>52</u>

SAT Total Site Trips

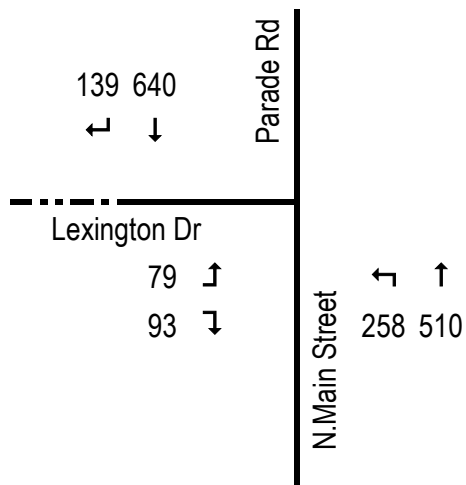
50	219	Parade Rd
↑	↓	
Lexington Dr		
53	↑	
0	↓	
N Main Street	↑	↑
	0	227

SAT Site Composition Trips

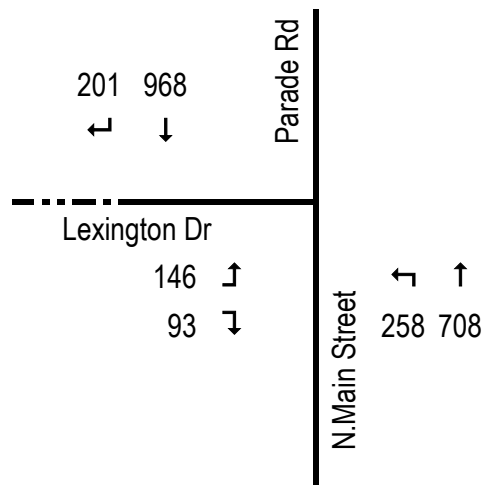
Primary, Pass-by, Diverted Link, Residential

<u>7</u>	<u>101</u>	Parade Rd
43	88	
↑	↓	
Lexington Dr		
<u>7</u>	46	↑
<u>0</u>	0	↓
N Main Street	↑	↑
	0	93
	<u>0</u>	<u>104</u>
		<u>30</u>

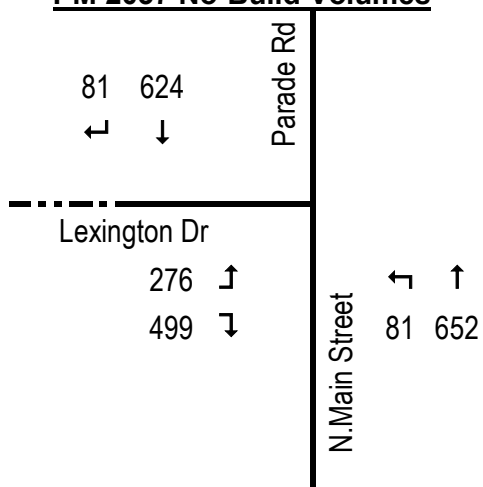
AM 2037 No-Build Volumes



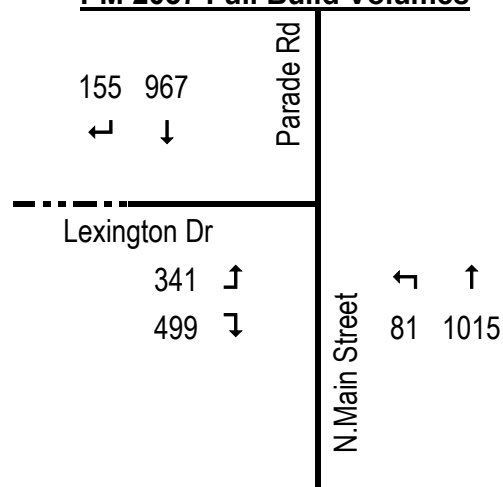
AM 2037 Full Build Volumes



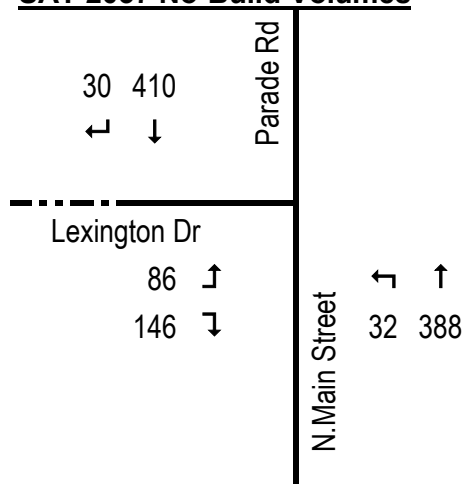
PM 2037 No-Build Volumes



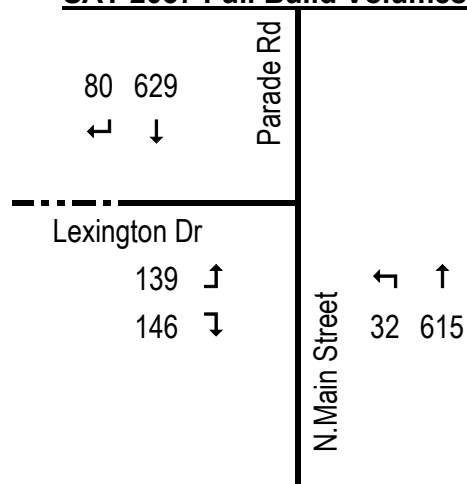
PM 2037 Full Build Volumes



SAT 2037 No-Build Volumes



SAT 2037 Full Build Volumes



Summary of Operating Conditions

Intersection #14: Parade Rd (NH106) at Lexington Dr [Unsignalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Signal				2037 Build Mitigation: Roundabout			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	---	30.9	C	---	---	>300	F	---	0.73	18.4	B	---	0.62	8.2	A	---
EB	---	293.2	F	221	---	>300	F	>800	---	29.2	C	162	0.31	8.0	A	28
NB	---	4.2	A	43	---	5.3	A	81	---	13.0	B	236	0.35	2.5	A	47
SB	---	0.0	A	0	---	0.0	A	0	---	20.7	C	390	0.62	12.9	B	166
PM Peak OVERALL	---	>300	F	---	---	>300	F	---	0.98	30.8	C	---	0.73	8.3	A	---
EB	---	>300	F	>800	---	>300	F	>800	---	53.2	D	417	0.73	13.8	B	125
NB	---	1.1	A	9	---	0.9	A	14	---	26.7	C	852	0.41	2.9	A	54
SB	---	0.0	A	0	---	0.0	A	0	---	17.8	B	347	0.49	9.5	A	85
SAT Peak OVERALL	---	4.0	A	---	---	19.1	C	---	0.58	10.3	B	---	0.29	4.3	A	---
EB	---	17.8	C	39	---	109.3	F	232	---	17.4	B	101	0.20	4.9	A	19
NB	---	0.7	A	3	---	0.5	F	3	---	7.6	A	227	0.23	1.9	A	27
SB	---	0.0	A	0	---	0.0	F	0	---	9.8	A	162	0.29	6.2	A	39

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service ^d Longest 95th Queue at approach

Intersection #14: Parade Rd (NH106) at Lexington Dr	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	1719	655	27.6%
PM Peak Hour	2213	845	27.6%
SAT Peak Hour	1092	649	37.3%

Analysis

The Main Street/Parade Road approaches are unaffected as they run free. Lexington Drive traffic runs over capacity during weekday peak hours with lengthy delays under no-build conditions.

New project-related traffic is largely through traffic on Parade Road/Main Street, but may include some site-related turns related to local residents visiting Laconia Village and Laconia Village residents that work on Lexington Drive.

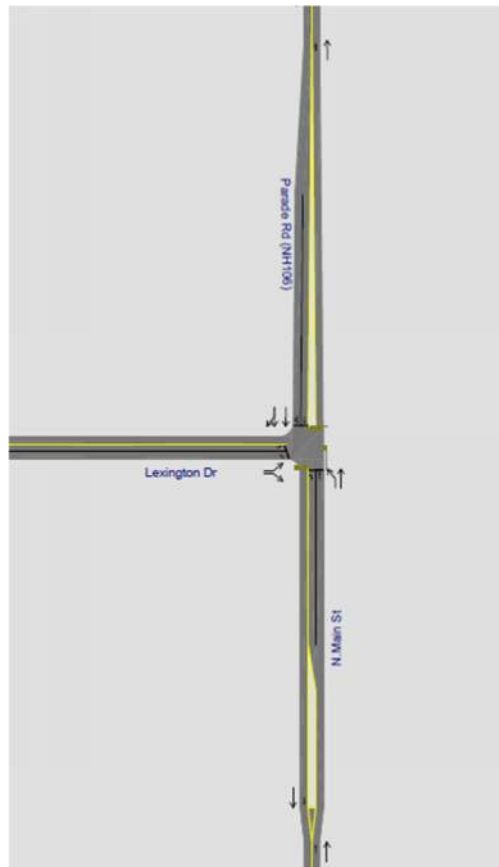
We considered signalization and a roundabout (see Attachments) as potential mitigation options. All critical storage lanes are already present at this intersection which will simplify signalization. The Two SB thru lanes are needed to process SB volumes during all peak hours. The roundabout would need a bypass for NB thru travel, two lanes for SB thru and a slip lane EBR.

We find the signalization option to be the most cost-effective and appropriate solution for this intersection.

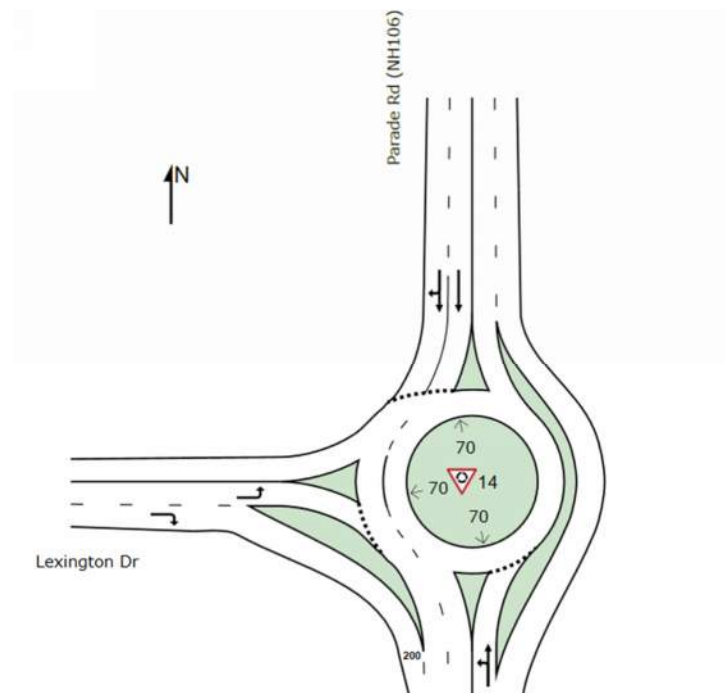
Recommended Mitigation

- Construct signalized intersection

Signal Alternate



Roundabout Alternate



Intersection #15: N.Main St (NH106) at Oak St

Existing Conditions

This is an existing 4-way signalized intersection within City jurisdiction.

N.Main Street (NH106) forms the NB and SB approaches with Oak Street forming the EB and WB approaches.

The EB and WB legs are single lane approaches accommodating two-way traffic. NB and SB approaches each have an exclusive left turn lane and a thru-right lane.

The posted speed limit is 30 on N.Main Street and default speed is 30 mph along Oak Street. There are cobra-head streetlights on top of the mast arms at the northeast and southwest corners of the intersection. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.

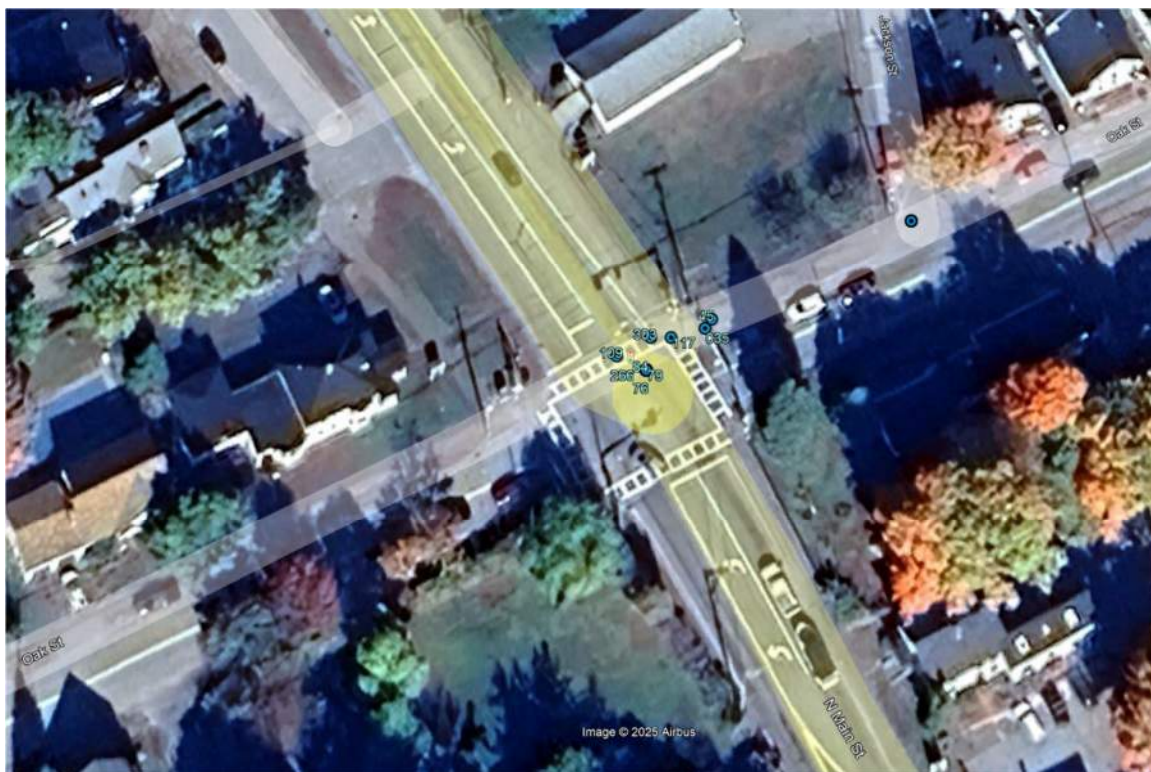


Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience is reasonable at 2.5 crashes (1 injury) per year.

Crash Data Summary Intersection #15: Parade Rd (NH106) at Oak St

CRASH FREQUENCY	
Total Crashes	10
Crashes per Year (Avg)	2.5
CRASH SEVERITY	
Property Damage Only	6
Injury	4
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	0
Other Motor Vehicle	10
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	0
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	1
Weekday PM (3-6pm)	1
Non-Commuter Peak	8



AM Total Site Trips

			N>Main Street			
11	308	10		↑ 22		
←	↓	→		↑ 0		
				↓ 0		
Oak Street				Oak Street		
	27	↑		←	↑	→
	0	→		0	149	0
	0	↓				
Oak Street			N>Main Street			

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			N>Main Street			
0	280	0		↑ 22	0	
11	21	10		↑ 0	0	
←	↓	→		↓ 0	0	
Oak Street				Oak Street		
0	27	↑		←	↑	→
0	0	→		0	50	0
0	0	↓		0	88	0
Oak Street			N>Main Street			
					11	

PM Total Site Trips

			N>Main Street			
28	295	22		↑ 15		
←	↓	→		↑ 0		
				↓ 0		
Oak Street				Oak Street		
	19	↑		←	↑	→
	0	→		0	331	0
	0	↓				
Oak Street			N>Main Street			

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			N>Main Street			
0	134	0		↑ 15	0	
28	107	22		↑ 0	0	
←	↓	→		↓ 0	0	
Oak Street				Oak Street		
0	19	↑		←	↑	→
0	0	→		0	69	0
0	0	↓		0	210	0
Oak Street			N>Main Street			
					52	

SAT Total Site Trips

			N>Main Street			
22	166	31		↑ 39		
←	↓	→		↑ 0		
				↓ 0		
Oak Street				Oak Street		
	24	↑		←	↑	→
	0	→		0	165	0
	0	↓				
Oak Street			N>Main Street			

SAT Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			N>Main Street			
0	88	13		↑ 19	20	
22	48	18		↑ 0	0	
←	↓	→		↓ 0	0	
Oak Street				Oak Street		
0	24	↑		←	↑	→
0	0	→		0	51	0
0	0	↓		0	84	0
Oak Street			N>Main Street			
					30	

AM 2037 No-Build Volumes

			N.Main Street			
7	733	188		↑	181	
←	↓	→		←	95	
				↓	141	
				Oak Street		
Oak Street			N.Main Street	←	↑	→
26		↓		5	661	74
118		→				
5		↓				

AM 2037 Full Build Volumes

			N.Main Street			
18	1041	198		↑	203	
←	↓	→		←	95	
				↓	141	
				Oak Street		
Oak Street			N.Main Street	←	↑	→
53		↓		5	810	74
118		→				
5		↓				

PM 2037 No-Build Volumes

			N.Main Street			
25	1034	213		↑	160	
←	↓	→		←	70	
				↓	93	
				Oak Street		
Oak Street			N.Main Street	←	↑	→
51		↓		11	666	60
58		→				
0		↓				

PM 2037 Full Build Volumes

			N.Main Street			
53	1329	235		↑	175	
←	↓	→		←	70	
				↓	93	
				Oak Street		
Oak Street			N.Main Street	←	↑	→
70		↓		11	997	60
58		→				
0		↓				

SAT 2037 No-Build Volumes

			N.Main Street			
9	613	90		↑	105	
←	↓	→		←	40	
				↓	35	
				Oak Street		
Oak Street			N.Main Street	←	↑	→
19		↓		11	427	33
30		→				
2		↓				

SAT 2037 Full Build Volumes

			N.Main Street			
31	779	121		↑	144	
←	↓	→		←	40	
				↓	35	
				Oak Street		
Oak Street			N.Main Street	←	↑	→
43		↓		11	592	33
30		→				
2		↓				

Summary of Operating Conditions

Intersection #15: N.Main St (NH106) at Oak St [Signalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Conc Peds				2037 Build Mitigation: Non-Constrained			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	1.08	88.2	F	---	1.25	152.9	F	---	1.23	125.8	F	---	0.87	40.2	D	---
EB	---	32.9	C	179	---	39.2	D	248	---	41.4	D	219	---	26.6	C	180
WB	---	251.3	F	679	---	287.7	F	718	---	254.5	F	710	---	59.2	E	575
NB	---	81.7	F	1049	---	169.4	F	1318	---	136.8	F	1203	---	46.2	D	493
SB	---	28.3	C	957	---	109.5	F	1528	---	84.7	F	1460	---	31.1	C	599
PM Peak OVERALL	1.07	73.3	E	---	1.32	175.9	F	---	1.28	155.7	F	---	0.84	33.6	C	---
EB	---	65.9	E	212	---	153.3	F	270	---	125.6	F	250	---	37.7	D	168
WB	---	237.7	F	560	---	264.4	F	582	---	205.5	F	541	---	59.7	E	444
NB	---	32.0	C	964	---	161.5	F	1585	---	152.4	F	1430	---	38.6	D	554
SB	---	56.0	E	1489	---	168.7	F	2084	---	149.8	F	1969	---	24.5	C	764
SAT Peak OVERALL	0.62	20.5	C	---	0.76	24.7	C	---	0.75	24.7	C	---	0.53	17.6	B	---
EB	---	29.5	C	71	---	35.7	D	103	---	33.9	C	113	---	24.3	C	89
WB	---	33.2	C	171	---	39.5	D	420	---	38.0	D	256	---	26.2	C	174
NB	---	18.6	B	531	---	23.3	C	837	---	26.1	C	514	---	22.0	C	259
SB	---	18.0	B	770	---	21.4	C	1100	---	19.8	B	806	---	12.0	B	308

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians; MIT Lanes: adds a thru lane to both NB and SB approaches

Intersection #15: N.Main St (NH106) at Oak St	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	2234	527	19.1%
PM Peak Hour	2441	710	22.5%
SAT Peak Hour	1414	447	24.0%

Analysis

Weekday AM and PM peak hour traffic is already over-capacity in no-build conditions. Saturday traffic is acceptable in build condition. The great majority of project-related traffic at the intersection consists of through-traffic on Main Street, along with some turns to/from Oak Street by Laconia residents working or shopping at the project site.

The existing signal runs an exclusive pedestrian phase. Changing to a concurrent pedestrian phase brings the intersection closer to pre-existing conditions; however, a single NB and SB through lane cannot effectively process the weekday through volumes trips at the intersection. However, there is insufficient ROW available to add auxiliary through lanes, which would improve the intersection to better than no-build conditions.

Vegetation on private property reduces visual sight distance at some approaches. These restrictions are less significant at a signalized intersection and are not related to the “Build” conditions. Current sight distance should be reviewed and addressed by the City. Pictures are provided in Appendix Q to show visual approximate locations of visual obstructions.

Recommended Mitigation

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider acquiring additional ROW to add through lanes on Main St.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

Alternate Mitigation Option

- The city asked for a non-constrained option that would eliminate all failing LOS at the intersection. The intersection cannot process the through volumes with single NB and SB lanes, two through lanes are needed in both directions on the mainline to accommodate traffic volumes. However, with existing ROW, the physical lane width improvement is not feasible currently. See aerial overlay in Appendix Q.

Intersection #19: N.Main Street at New Salem St

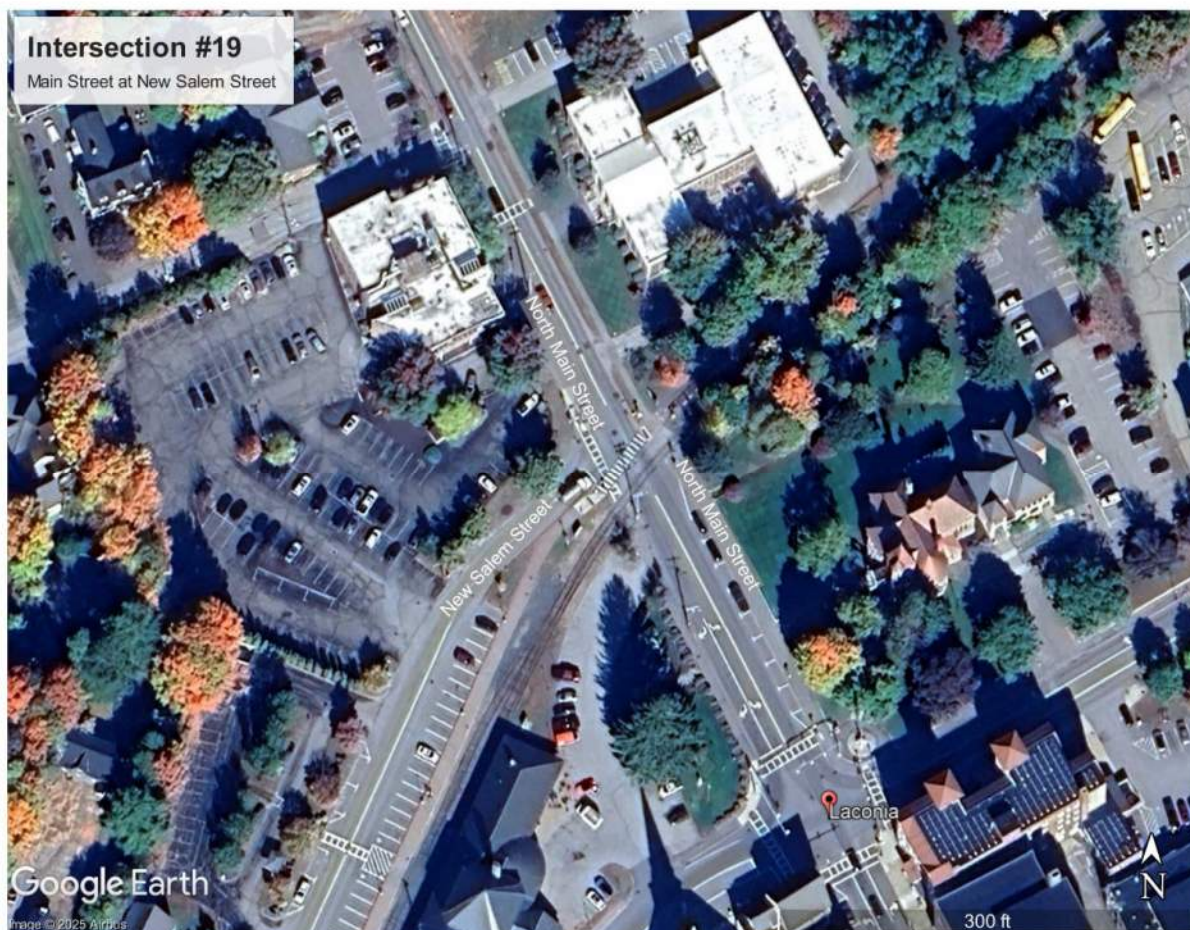
Existing Conditions

This is an existing 3-way, stop controlled intersection under City jurisdiction.

N. Main Street forms the NB and SB approaches, New Salem Street forms the EB approach.

Each approach carries two-way traffic on single lanes. North Main Street has free flow, where New Salem Street is under stop control.

The speed limit is 30 mph on N. Main Street and not posted on New Salem with no street lighting at the intersection. There is a pedestrian crosswalk at the EB approach. A major trail crossing is stripped east-west across N. Main Street that connects the WOW bike/walking Trail.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience at this intersection is low -less than 2per year

Crash Data Summary Intersection #19: N.Main Street at New Salem St

CRASH FREQUENCY	
Total Crashes	5
Crashes per Year (Avg)	1.25
CRASH SEVERITY	
Property Damage Only	3
Injury	2
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	0
Other Motor Vehicle	5
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	0
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	1
Non-Commuter Peak	4



AM Total Site Trips

		N.Main Street	
196	111		
←	↓		
New Salem Street			
	75	←	
	0	↓	
		N.Main Street	
		←	↑
		0	74

AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

		N.Main Street	
<i>2</i>	<i>5</i>		
<i>190</i>	<i>90</i>		
4	16		
←	↓		
New Salem Street			
<i>4</i>	<i>60</i>	11	↑
	<i>0</i>	0	↓
		N.Main Street	
		←	↑
		0	38
		<i>0</i>	<i>28</i>
			<i>8</i>

PM Total Site Trips

		N.Main Street	
124	168		
←	↓		
New Salem Street			
	170	←	
	0	↓	
		N.Main Street	
		←	↑
		0	160

PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

		N.Main Street	
<i>17</i>	<i>36</i>		
<i>91</i>	<i>43</i>		
16	89		
←	↓		
New Salem Street			
<i>17</i>	<i>142</i>	11	↑
	<i>0</i>	0	↓
		N.Main Street	
		←	↑
		0	58
		<i>0</i>	<i>67</i>
			<i>35</i>

SAT Total Site Trips

		N.Main Street	
48	117		
←	↓		
New Salem Street			
	36	←	
	0	↓	
		N.Main Street	
		←	↑
		0	128

SAT Site Composition Trips

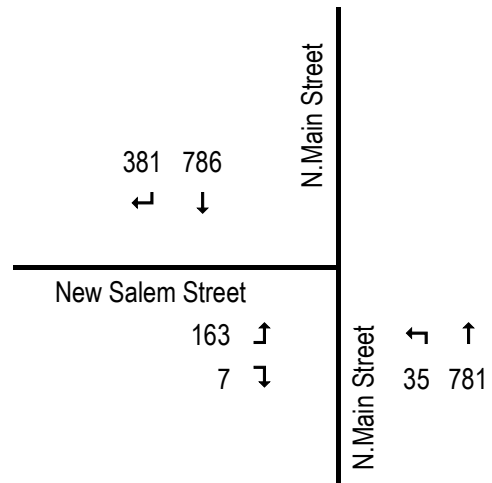
Primary, *Pass-by*, *Diverted Link*, *Residential*

		N.Main Street	
<i>9</i>	<i>20</i>		
<i>26</i>	<i>62</i>		
13	35		
←	↓		
New Salem Street			
<i>9</i>	<i>13</i>	14	↑
	<i>0</i>	0	↓
		N.Main Street	
		←	↑
		0	37
		<i>0</i>	<i>71</i>
			<i>20</i>

AM 2037 No-Build Volumes



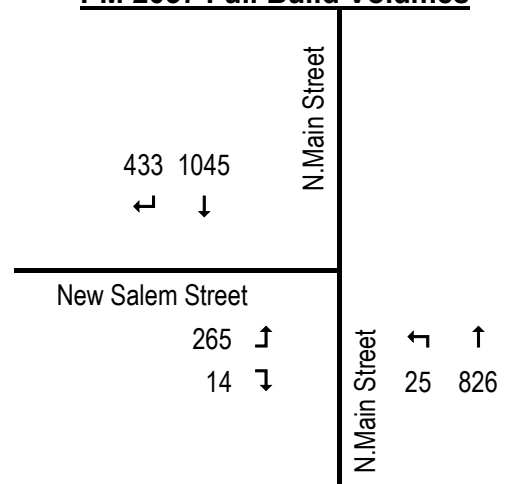
AM 2037 Full Build Volumes



PM 2037 No-Build Volumes



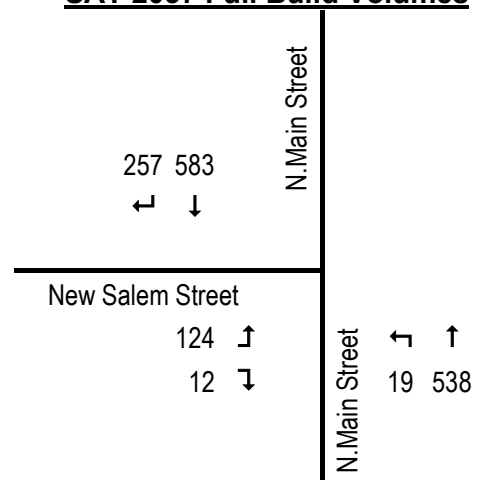
PM 2037 Full Build Volumes



SAT 2037 No-Build Volumes



SAT 2037 Full Build Volumes



Summary of Operating Conditions

Intersection #19: N.Main Street at New Salem St [Unsignalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Turn Lanes				2037 Build Mitigation: Non-Constrained			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	---	3.0	A	---	---	26.5	D	---	---	6.4	A	---	---	4.6	A	---
EB	0.50	37.8	E	63	1.48	315.9	F	408	0.85	72.8	F	197	-	-	-	-
NB	0.07	2.0	A	5	0.11	4.1	A	11	0.06	1.7	A	0	0.41	-	-	-
SB	0.56	0.0	A	0	0.76	0.0	A	0	0.51	0.0	A	0	-	-	-	-
PM Peak OVERALL	---	14.1	B	---	---	>300	F	---	---	105.3	F	---	---	1.5	A	---
EB	1.21	235.3	F	196	5.08	Err	F	>800	2.96	>300	F	>800	-	-	-	-
NB	0.08	2.9	A	8	0.13	7.1	A	19	0.07	2.5	A	19	0.48	9.8	A	16
SB	0.77	0.0	A	0	0.96	0.0	A	0	0.68	0.0	A	0	0.96	0.0	A	0
SAT Peak OVERALL	---	1.7	A	---	---	3.8	A	---	---	2.1	A	---	---	0.2	A	---
EB	0.28	17.7	C	28	0.60	38.3	E	66	0.39	20.5	C	46	-	-	-	-
NB	0.03	0.8	A	2	0.03	1.0	A	3	0.02	0.6	A	0	0.29	1.3	A	3
SB	0.44	0.0	A	0	0.55	0.0	A	0	0.38	0.0	A	0	0.55	0.0	A	0

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Lanes: adds a right turn lane EB and SB approaches

Intersection #19: N.Main Street at New Salem St	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	1697	456	21.2%
PM Peak Hour	1986	622	23.8%
SAT Peak Hour	1204	329	21.5%

Analysis

Main Street approaches are unaffected as they run free. NB traffic on New Salem Street runs over capacity during the PM peak hour due to EB left turns and through volumes on Main Street. The 22% new traffic added to the intersection are primarily on Main Street, but do include some EB left turns on New Salem Street. Note that as left turn delays increase, left turning traffic may also turn right on Pleasant Street and left at the Main Street signal, which will reduce delays at the stop sign. Adding a channelized SB right turn will increase gaps in Main Street traffic and also improve left turn delays. The intersection meets all turn lane warrants – left, right and second lane. However, right of way limitations and on street parking do not permit adding auxiliary lanes.

Signalizing the intersection is not recommended since there is only 250' to the Veterans Sq/Church St signal, which would likely cause congestion and blocking in peak hours. Warrant analysis shows only the PM peak hour signal warrant is likely to be met.

Another option the City could explore is to make a one-way traffic pair with New Salem Street one-way south between Main Street and Pleasant Street, and Veterans Square one-way north to the Main St signal, providing a signalized left turn for NB traffic.

Recommended Mitigation

- Add a channelized SB right turn lane on Main Street.

Right Turn Lane Alternate



Alternate Mitigation Option

- The City may wish to consider making New Salem one-way southbound and moving all left turns to Veterans Square where there is access to an existing signal to improve left turn conditions off minor roads along N. Main Street. See Intersection #16 for a complete explanation of the proposal for the modifications of the two intersections and the aerial layout in Appendix Q.

Intersection #16: ***N.Main Street (NH106) at Veterans Sq / Church St***

Existing Conditions

This is an existing 4-way signalized intersection (City jurisdiction).

N.Main Street (NH106) forms the NB and SB approaches with Veterans Square forming the EB approach and Church Street forming the WB approach.

The NB approach is one way only allowing exiting traffic. All other approaches accommodate two-way traffic. SB approach has a left turn and right turn lane. EB has a left turn lane and a thru lane where the WB approach has right turn lane and a thru lane.

The City speed limit is 30 mph. There are no streetlights on top of the mast arms but there are streetlamp on the sidewalks at the NE, SE and SW corners. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience at this intersection is less than 2 per year.

Crash Data Summary Intersection #16: N.Main Street (NH106) at Veterans Sq / Church St

CRASH FREQUENCY	
Total Crashes	7
Crashes per Year (Avg)	1.75
CRASH SEVERITY	
Property Damage Only	6
Injury	1
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	0
Other Motor Vehicle	7
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	0
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	3
Non-Commuter Peak	4



AM Total Site Trips

		N Main Street			
71	31		28		
←	→		←	0	
Veterans Square			Church Street		
0	↑		←	↑	→
0	→		0	31	0
		Main Street (one-way)			

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

2	2	N Main Street			
67	22		17	7	4
2	7		←	0	0
←	→		Church Street		
Veterans Square			←	↑	→
0	0	↑	0	6	0
0	0	→	0	21	0
		Main Street (one-way)			4

PM Total Site Trips

		N Main Street			
101	50		49		
←	→		←	0	
Veterans Square			Church Street		
0	↑		←	↑	→
0	→		0	102	0
		Main Street (one-way)			

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

19	17	N Main Street			
32	11		15	17	17
50	22		←	0	0
←	→		Church Street		
Veterans Square			←	↑	→
0	0	↑	0	33	0
0	0	→	0	50	0
		Main Street (one-way)			19

SAT Total Site Trips

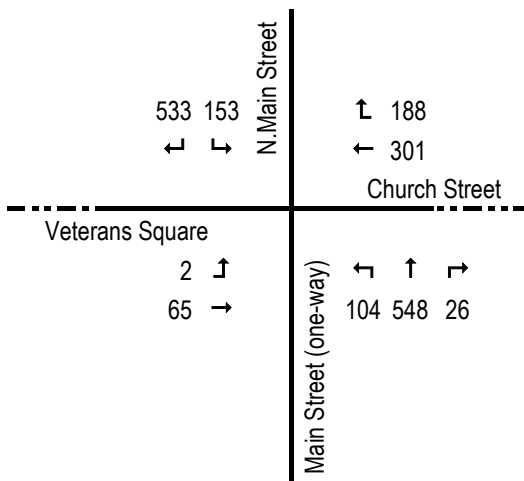
		N Main Street			
68	35		39		
←	→		←	0	
Veterans Square			Church Street		
0	↑		←	↑	→
0	→		0	74	0
		Main Street (one-way)			

SAT Site Composition Trips

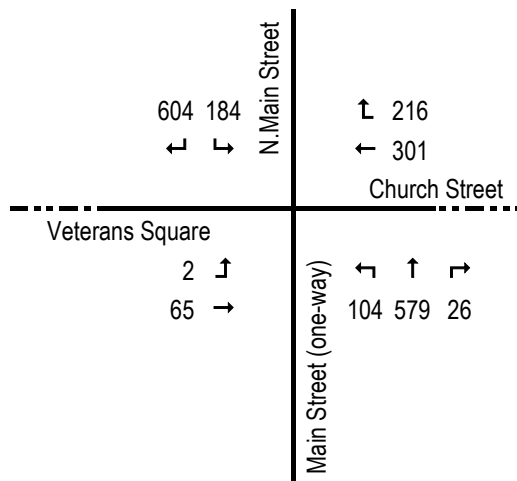
Primary, Pass-by, Diverted Link, Residential

11	9	N Main Street			
49	13		13	17	9
8	13		←	0	0
←	→		Church Street		
Veterans Square			←	↑	→
0	0	↑	0	9	0
0	0	→	0	54	0
		Main Street (one-way)			11

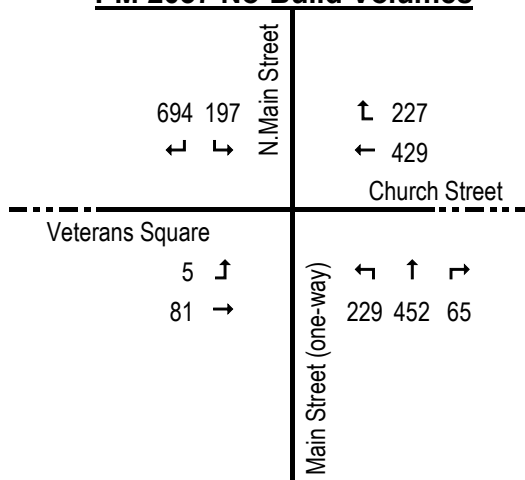
AM 2037 No-Build Volumes



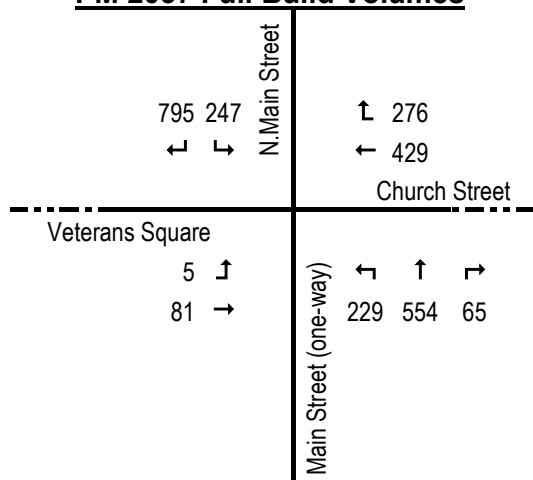
AM 2037 Full Build Volumes



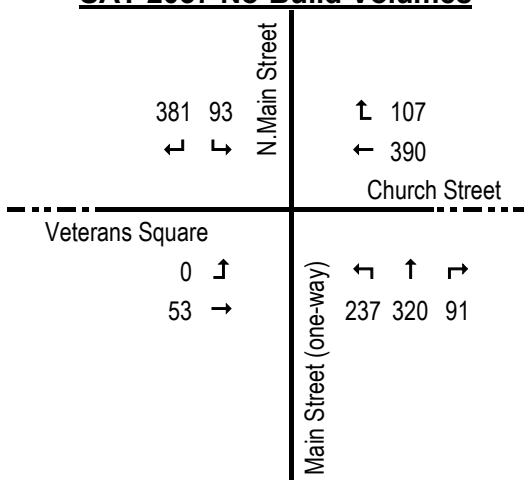
PM 2037 No-Build Volumes



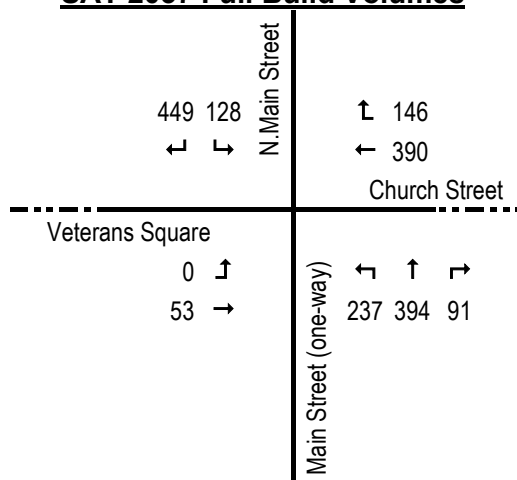
PM 2037 Full Build Volumes



SAT 2037 No-Build Volumes



SAT 2037 Full Build Volumes



Summary of Operating Conditions

Intersection #16: N.Main St (NH106) at Veterans and Church St [Signalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Conc Peds				2037 Build Mitigation: Non-Constrained			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	0.75	46.2	D	---	0.80	58.3	E	---	0.79	29.9	C	---	0.68	35.5	D	---
EB	---	20.3	C	79	---	21.3	C	79	---	28.8	C	80	---	36.0	D	147
WB	---	21.0	C	371	---	21.3	C	371	---	34.1	C	383	---	35.1	D	191
NB	---	90.5	F	786	---	126.5	F	836	---	32.9	C	653	---	38.8	D	343
SB	---	22.8	C	164	---	24.3	C	196	---	24.4	C	199	---	32.7	C	240
PM Peak OVERALL	0.79	34.2	C	---	0.89	57.5	E	---	0.89	45.7	D	---	0.86	52.8	D	---
EB	---	21.5	C	94	---	22.6	C	94	---	26.9	C	91	---	48.4	D	257
WB	---	35.3	D	582	---	37.9	B	582	---	47.1	D	544	---	53.0	D	261
NB	---	44.5	D	620	---	103.5	F	789	---	47.5	D	663	---	44.1	D	346
SB	---	25.8	C	208	---	36.0	D	390	---	44.8	D	404	---	61.2	E	388
SAT Peak OVERALL	0.59	25.7	C	---	0.67	26.4	C	---	0.69	26.1	C	---	0.59	34.6	C	---
EB	---	19.2	B	67	---	19.8	B	67	---	19.9	B	58	---	34.8	C	122
WB	---	27.3	C	515	---	27.3	C	515	---	27.1	C	423	---	35.3	D	260
NB	---	24.7	C	401	---	29.1	C	527	---	28.3	C	433	---	33.9	C	272
SB	---	26.6	C	105	---	22.9	C	139	---	23.0	C	123	---	35.3	D	148

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians

Intersection #16: N.Main St (NH106) at Veterans and Church St	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	1920	161	7.7%
PM Peak Hour	2379	302	11.3%
SAT Peak Hour	1672	216	11.4%

Analysis

Existing intersection runs within capacity during all peak hours, however, the NB approach operates at LOS F in AM conditions. The project adds only 11% new traffic to the intersection. ROW restrictions do not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. This intersection is unlikely to be improved by coordination.

Recommended Mitigation

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

Alternate Mitigation Option

- The City may wish to consider making New Salem one-way southbound, adding a SBR turn lane and moving all left turns to Veterans Square to improve left turn conditions at New Salem Street. To accommodate the left turns, additional lanes are proposed at Veterans Square and N. Main Street. Two receiving lanes at the southbound approach will allow two through lanes from the NB approach of N. Main Street and two left turn lanes at the EB approach. To process the WB traffic, two receiving lanes are proposed on Veterans Square. The additional lanes allow for the processing of the added left turns along with improving the overall capacity of the intersection. See the proposed aerial layout in Appendix Q.
- Some parking spaces will need to be removed to accommodate the additional lanes. This mitigation option also proposes adding angled parking along the one-way New Salem Street.

Intersection #17: ***Court St (US3Bus)/Union Ave (US3Bus) at S.Main/N.Main St***

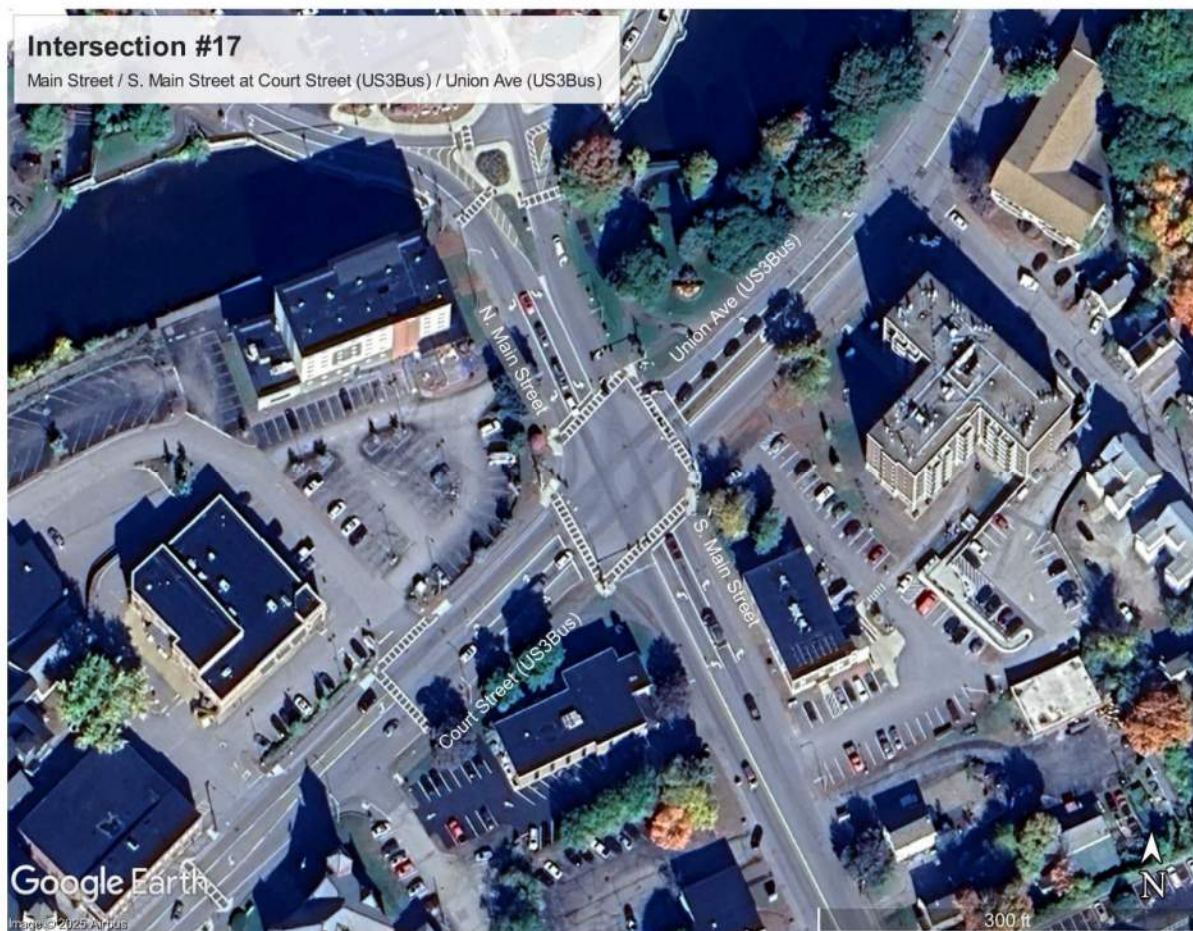
Existing Conditions

This is an existing 4-way signalized intersection (City jurisdiction).

N.Main Street and S.Main Street (NH106) forms the NB and SB approaches respectively, with Court Street (US3Bus) forming the EB approach and Union Street (US3Bus) forming the WB approach.

All approaches accommodate two-way traffic. Each approach provides three lanes, an exclusive left turn lane, a thru lane and an exclusive right turn lane.

The City speed limit is 30 mph. There are cobra-head streetlights at all four corners on top of the signal mast arms. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience at less than 8 per year (only 4 injury accidents) is not exceptional for the high volume of traffic (30,000+ ADT) at this location.

Crash Data Summary Intersection #17: Court St (US3Bus) / Union Ave (US3Bus) at S.Main St / N.Main St

CRASH FREQUENCY	
Total Crashes	30
Crashes per Year (Avg)	7.5
CRASH SEVERITY	
Property Damage Only	26
Injury	4
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	4
Other Motor Vehicle	24
Pedestrian	2
WEATHER	
Sun Glare	0
Rain/Wet	7
Snow/Ice	1
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	4
Weekday PM (3-6pm)	9
Non-Commuter Peak	17



AM Total Site Trips

			N>Main Street			
0	32	0		↑	0	
←	↓	→		←	0	
				↘	0	
Court Street (US3Bus)				Union Ave (US3Bus)		
	0	↑	S>Main Street	←	↑	↘
	0	→		0	19	0
	0	↘				

AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

			N>Main Street			
0	28	0		↑	0	0
←	↓	→		←	0	0
				↘	0	0
Court Street (US3Bus)				Union Ave (US3Bus)		
0	0	↑	S>Main Street	←	↑	↘
0	0	→		0	6	0
0	0	↘		0	9	0
					4	

PM Total Site Trips

			N>Main Street			
0	82	0		↑	0	
←	↓	→		←	0	
				↘	0	
Court Street (US3Bus)				Union Ave (US3Bus)		
	0	↑	S>Main Street	←	↑	↘
	0	→		0	73	0
	0	↘				

PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

			N>Main Street			
0	13	0		↑	0	0
←	↓	→		←	0	0
				↘	0	0
Court Street (US3Bus)				Union Ave (US3Bus)		
0	0	↑	S>Main Street	←	↑	↘
0	0	→		0	33	0
0	0	↘		0	21	0
					19	

SAT Total Site Trips

			N>Main Street			
0	68	0		↑	0	
←	↓	→		←	0	
				↘	0	
Court Street (US3Bus)				Union Ave (US3Bus)		
	0	↑	S>Main Street	←	↑	↘
	0	→		0	74	0
	0	↘				

SAT Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

			N>Main Street			
0	49	0		↑	0	0
←	↓	→		←	0	0
				↘	0	0
Court Street (US3Bus)				Union Ave (US3Bus)		
0	0	↑	S>Main Street	←	↑	↘
0	0	→		0	9	0
0	0	↘		0	54	0
					11	

AM 2037 No-Build Volumes

178 441 33			N. Main Street	↑ 135		
←	↓	→		←	311	
				↓	155	
Court Street (US3Bus)			S. Main Street	Union Ave (US3Bus)		
292	↑			←	↑	→
394	→			109	540	199
116	↓					

AM 2037 Full Build Volumes

178 473 33			N. Main Street	↑ 135		
←	↓	→		←	311	
				↓	155	
Court Street (US3Bus)			S. Main Street	Union Ave (US3Bus)		
292	↑			←	↑	→
394	→			109	559	199
116	↓					

PM 2037 No-Build Volumes

355 564 51			N. Main Street	↑ 98		
←	↓	→		←	432	
				↓	246	
Court Street (US3Bus)			S. Main Street	Union Ave (US3Bus)		
329	↑			←	↑	→
475	→			146	450	225
185	↓					

PM 2037 Full Build Volumes

355 646 51			N. Main Street	↑ 98		
←	↓	→		←	432	
				↓	246	
Court Street (US3Bus)			S. Main Street	Union Ave (US3Bus)		
329	↑			←	↑	→
475	→			146	523	225
185	↓					

SAT 2037 No-Build Volumes

255 348 54			N. Main Street	↑ 120		
←	↓	→		←	385	
				↓	207	
Court Street (US3Bus)			S. Main Street	Union Ave (US3Bus)		
274	↑			←	↑	→
482	→			107	318	258
146	↓					

SAT 2037 Full Build Volumes

255 416 54			N. Main Street	↑ 120		
←	↓	→		←	385	
				↓	207	
Court Street (US3Bus)			S. Main Street	Union Ave (US3Bus)		
274	↑			←	↑	→
482	→			107	392	258
146	↓					

Summary of Operating Conditions

Intersection #17: Court St (US3Bus) / Union Ave (US3Bus) at S.Main St / N.Main St [Signalized]

	2037 No-Build				2037 Build				2037 Build Mitigation: Conc Peds			
Approach	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	0.94	85.4	F	---	0.95	91.8	F	---	0.96	59.1	E	---
EB	---	126.6	F	786	---	126.6	F	786	---	78.2	E	513
WB	---	47.2	D	479	---	47.2	D	479	---	52.4	D	385
NB	---	74.9	E	1161	---	82.6	F	1211	---	51.6	D	801
SB	---	82.9	F	1023	---	101.2	F	1112	---	51.9	D	638
PM Peak OVERALL	1.06	143.2	F	---	1.12	168.7	F	---	1.16	100.7	F	---
EB	---	181.9	F	903	---	181.9	F	903	---	106.2	F	652
WB	---	100.3	F	707	---	100.3	F	707	---	80.7	F	556
NB	---	65.5	E	919	---	90.1	F	112	---	53.2	D	715
SB	---	201.7	F	1366	---	269.8	F	1591	---	149.7	F	995
SAT Peak OVERALL	0.82	71.1	E	---	0.87	76.5	E	---	0.89	51.8	D	---
EB	---	104.9	F	862	---	104.9	F	862	---	51.8	D	585
WB	---	63.6	E	579	---	63.6	E	579	---	57.2	E	458
NB	---	47.5	D	524	---	51.5	D	724	---	39.3	D	493
SB	---	57.8	E	737	---	79.7	E	925	---	59.2	E	597

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians

Intersection #17: Court St (US3Bus) / Union Ave (US3Bus) at S.Main St / N.Main St	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	2903	51	1.7%
PM Peak Hour	3556	155	4.2%
SAT Peak Hour	2954	142	4.6%

Analysis

Intersection is at capacity in existing AM and PM conditions, and near capacity in the Saturday peak hours. Project site trips add only a few percent new trips to the intersection. ROW restrictions do not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. This intersection is unlikely to be improved by coordination.

Recommended Mitigation

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

Intersection #20: Fair St at Court St (US3Bus)

Existing Conditions

This is an existing 4-way intersection with side-street stop control under City jurisdiction.

Locally, Court Street runs east/west, and Fair Street forms the NB and SB approaches, Court Street (US3Bus) forms the EB and WB approaches .

The NB approach is one way only allowing exiting traffic with a single lane. All other approaches accommodate two-way traffic. SB approach has a left turn and right turn lane. EB has a left turn lane and a thru lane where the WB approach has right/thru lane with a TWLT pocket striped.

The speed limit is 30 mph on Court Street and there are cobra-head streetlights on utility poles at the NE and SE corners. There are no crosswalks striped at the intersection but there are sidewalks at all four corners.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Although crash experience is reasonable, many crashes are caused by a sight distance restriction for SB left turns from Fair St. onto Court St. See Mitigation section below.

Crash Data Summary
Intersection #20: Fair St at Court St (US3Bus)

CRASH FREQUENCY	
Total Crashes	9
Crashes per Year (Avg)	2.25
CRASH SEVERITY	
Property Damage Only	6
Injury	3
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	0
Other Motor Vehicle	9
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	0
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	5
Non-Commuter Peak	4



AM Total Site Trips

		Fair Street			
		153	0	↑	0
		←	→	↑	0
		Court Street (US3Bus)			
Court Street (US3Bus)		52	↑	←	↑
		0	→	0	0
		Fair Street (one-way)			

AM Site Composition Trips

Primary, [Pass-by](#), [Diverted Link](#), [Residential](#)

		Fair Street			
		2	0	↑	0
		151	0	↑	0
		0	0	↑	0
		←	→	↑	0
		Court Street (US3Bus)			
Court Street (US3Bus)		4	48	0	↑
		0	0	0	→
		Fair Street (one-way)			
		0	0	0	0
		0	0	0	0
		Fair Street (one-way)			

PM Total Site Trips

		Fair Street			
		95	0	↑	0
		←	→	↑	0
		Court Street (US3Bus)			
Court Street (US3Bus)		134	↑	←	↑
		0	→	0	0
		Fair Street (one-way)			

PM Site Composition Trips

Primary, [Pass-by](#), [Diverted Link](#), [Residential](#)

		Fair Street			
		17	0	↑	0
		72	0	↑	0
		6	0	↑	0
		←	→	↑	0
		Court Street (US3Bus)			
Court Street (US3Bus)		17	113	4	↑
		0	0	0	→
		Fair Street (one-way)			
		0	0	0	0
		0	0	0	0
		Fair Street (one-way)			

SAT Total Site Trips

		Fair Street			
		40	0	↑	0
		←	→	↑	0
		Court Street (US3Bus)			
Court Street (US3Bus)		27	↑	←	↑
		0	→	0	0
		Fair Street (one-way)			

SAT Site Composition Trips

Primary, [Pass-by](#), [Diverted Link](#), [Residential](#)

		Fair Street			
		9	0	↑	0
		26	0	↑	0
		5	0	↑	0
		←	→	↑	0
		Court Street (US3Bus)			
Court Street (US3Bus)		9	13	5	↑
		0	0	0	→
		Fair Street (one-way)			
		0	0	0	0
		0	0	0	0
		Fair Street (one-way)			

AM 2037 No-Build Volumes

Fair Street		Fair Street	
301	23	↑ 58	
←	→	← 475	
Court Street (US3Bus)		Court Street (US3Bus)	
320	↑	←	↑
684	→	2	16 9
Fair Street (one-way)		Fair Street (one-way)	

AM 2037 Full Build Volumes

Fair Street		Fair Street	
454	23	↑ 58	
←	→	← 475	
Court Street (US3Bus)		Court Street (US3Bus)	
372	↑	←	↑
684	→	2	16 9
Fair Street (one-way)		Fair Street (one-way)	

PM 2037 No-Build Volumes

Fair Street		Fair Street	
519	14	↑ 39	
←	→	← 84	
Court Street (US3Bus)		Court Street (US3Bus)	
111	↑	←	↑
786	→	3	3 9
Fair Street (one-way)		Fair Street (one-way)	

PM 2037 Full Build Volumes

Fair Street		Fair Street	
614	14	↑ 39	
←	→	← 84	
Court Street (US3Bus)		Court Street (US3Bus)	
245	↑	←	↑
786	→	3	3 9
Fair Street (one-way)		Fair Street (one-way)	

SAT 2037 No-Build Volumes

Fair Street		Fair Street	
343	35	↑ 47	
←	→	← 661	
Court Street (US3Bus)		Court Street (US3Bus)	
229	↑	←	↑
728	→	3	2 5
Fair Street (one-way)		Fair Street (one-way)	

SAT 2037 Full Build Volumes

Fair Street		Fair Street	
383	35	↑ 47	
←	→	← 661	
Court Street (US3Bus)		Court Street (US3Bus)	
256	↑	←	↑
728	→	3	2 5
Fair Street (one-way)		Fair Street (one-way)	

Summary of Operating Conditions

Intersection #20: Fair St at Court St (US3Bus) [Unsignalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: No SBL			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	---	17.3	C	---	---	157.2	F	---	---	144.9	F	---
EB	0.45	3.4	A	41	0.45	3.9	A	52	0.45	3.9	A	52
WB	0.34	0.0	A	0	0.34	0.0	A	0	0.34	0.0	A	0
NB	0.82	259.6	F	74	3.83	>300	F	>800	3.83	>300	F	>800
SB	1.42	68.2	F	106	2.27	53.1	F	297	0.94	53.1	F	297
PM Peak OVERALL	---	6.3	A	---	---	9.3	A	---	---	8.8	A	---
EB	0.51	1.0	A	7	0.51	1.9	A	17	0.51	1.9	A	17
WB	0.08	0.0	A	0	0.08	0.0	A	0	0.08	0.0	A	0
NB	0.18	54.5	F	16	0.46	174.6	F	38	0.46	174.6	F	38
SB	0.61	15.2	C	109	0.72	19.2	C	164	0.72	18.2	C	164
SAT Peak OVERALL	---	31.8	C	---	---	>300	F	---	---	>300	F	---
EB	0.47	2.7	A	31	0.47	3.0	3.0	37	0.47	3.0	A	37
WB	0.46	0.0	A	0	0.46	0.0	0.0	0	0.46	0.0	A	0
NB	2.80	>300	F	63	>5.0	>300	>300	>800	>5.0	>300	F	>800
SB	1.31	99.7	F	260	1.50	130.5	130.5	346	1.05	89.3	F	346

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d Longest 95th Queue at approach

MIT No SBL: removes south bound left turn lane, no SBL at intersection

Intersection #20: Fair St at Court St (US3Bus)	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	1888	205	9.8%
PM Peak Hour	1568	229	16.6%
SAT Peak Hour	2053	67	3.2%

Analysis

Locally, US3Bus forms the B and EB approaches, and Fair St runs north-south. All project trips at this intersection are SB right turns and EB left turns to/from the marina and New Salem Street. The problem movements at this intersection are not caused by site trips.

The primary safety issue is a hedge on private property that obstructs sight distance for SB left turns. If the City cannot get permission from the owner to trim this hedge, SB left turns from Fair St onto Court Street should be restricted.

The operational issue is lengthy delays at the Fair St stop-controlled approaches. However, these are relatively low-volume movements that do not include site-related trips. It would be our recommendation to prohibit left turns to increase safety and lessen delays at the intersection.

Recommended Mitigation

- Obtain owner's permission to trim hedge at 173 Court Street or,
- Restrict SB left turns from Fair Street onto Court Street

Intersection #13

Union Ave (US3Bus) at Elm St / Clinton St

Existing Conditions

This is an existing 4-way signalized intersection.

Union Street (US3Bus) forms the NB and SB approaches with Elm Street forming the EB approach and Clinton Street forming the WB approach.

Each approach accommodates two-way traffic. The EB and SB approaches have exclusive right-turn lanes with a left-thru lane. WB is a single lane approach. The NB approach has an exclusive left-turn lane and a thru-right lane.

The posted speed limit is 30 mph on Elm Street and Union Ave (US3Bus). There are cobra-head streetlights on top of the mast arms at the northwest and southwest corners of the intersection and on a utility pole at the northeast corner. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. At less than 6 crashes per year, crash experience is relatively low.

Crash Data Summary Intersection #13: Union Ave (US3Bus) at Elm St / Clinton St

CRASH FREQUENCY	
Total Crashes	22
Crashes per Year (Avg)	5.5
CRASH SEVERITY	
Property Damage Only	8
Injury	4
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	0
Other Motor Vehicle	21
Animal	1
WEATHER	
Sun Glare	0
Rain/Wet	4
Snow/Ice	0
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	1
Weekday PM (3-6pm)	5
Non-Commuter Peak	16



AM Total Site Trips

			↓	↑			
62	0	0	US3 Bus.		↖	0	
					←	0	
					↗	0	
Elm Street			Union Ave (US3Bus)		↖	↑	↗
98	↖				41	0	0
0	→						
56	↘						
			Clinton Street				

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			↓	↑				
<u>2</u>	<u>27</u>	<u>0</u>	<u>0</u>	US3 Bus.		↖	0	<u>0</u>
	33	0	0			←	0	<u>0</u>
	↖	↓	↗			↘	0	<u>0</u>
				Clinton Street				
Elm Street				Union Ave (US3Bus)		↖	↑	↗
<u>1</u>	<u>84</u>	13	↖			27	0	0
	<u>0</u>	0	→					
	<u>45</u>	11	↘			<u>14</u>	<u>0</u>	<u>0</u>

PM Total Site Trips

			↓	↑			
101	0	0	US3 Bus.		↖	0	
					←	0	
					↗	0	
Elm Street			Union Ave (US3Bus)		Clinton Street		
94	↖				↖	↑	↗
0	→				53	0	0
49	↗						

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			↓	↑				
<u>9</u>	<u>63</u>	<u>0</u>	<u>0</u>	US3 Bus.	↖	0	<u>0</u>	
	29	0	0		←	0	<u>0</u>	
	↖	↓	↗		↘	0	<u>0</u>	
					Clinton Street			
Elm Street			Union Ave (US3Bus)		↖	↑	↗	
<u>10</u>	<u>40</u>	44			↖	19	0	0
	<u>0</u>	0						
	<u>21</u>	28				<u>34</u>	<u>0</u>	<u>0</u>
			Clinton Street					

SAT Total Site Trips

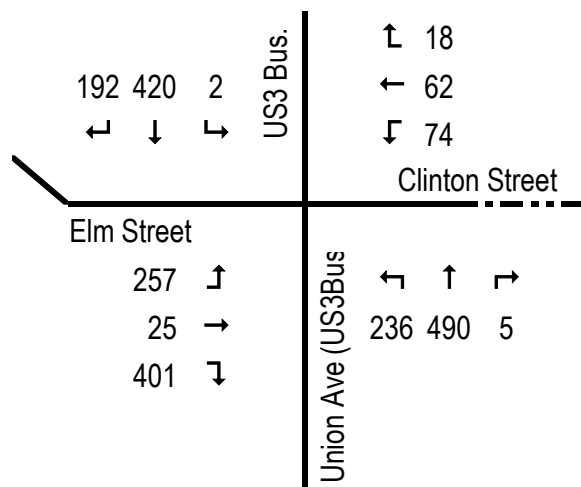
			↓	↑			
95	0	0	US3 Bus.		↖	0	
					←	0	
					↘	0	
Elm Street			Union Ave (US3Bus)		Clinton Street		
90	↖				↖	↑	↘
0	→				59	0	0
56	↘						

SAT Site Composition Trips

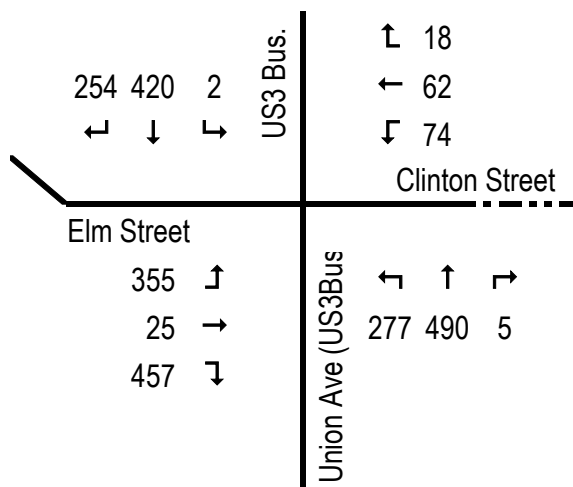
Primary, Pass-by, Diverted Link, Residential

			↓	↑			
<u>9</u>	<u>44</u>	<u>0</u>	<u>0</u>	US3 Bus.	↖	0	<u>0</u>
	42	0	0		←	0	<u>0</u>
	↖	↓	↗		↘	0	<u>0</u>
Elm Street					Clinton Street		
<u>9</u>	<u>42</u>	39	↖	Union Ave (US3Bus)	↖	↑	↗
	<u>0</u>	0	→		32	0	0
	<u>26</u>	30	↘		<u>27</u>	<u>0</u>	<u>0</u>

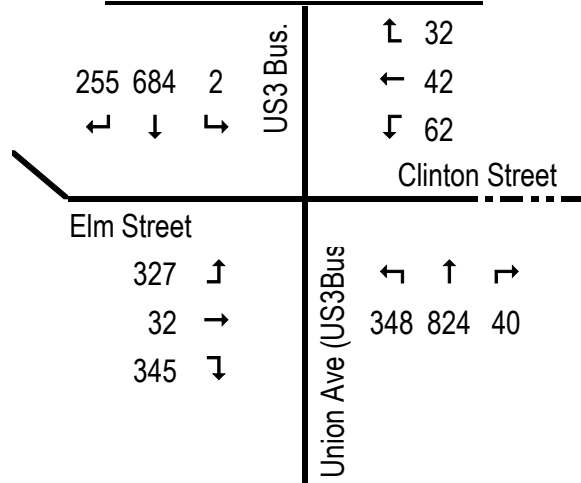
AM 2037 No-Build Volumes



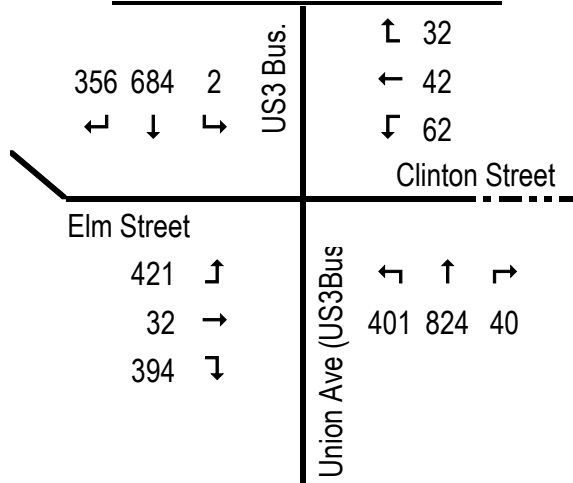
AM 2037 Full Build Volumes



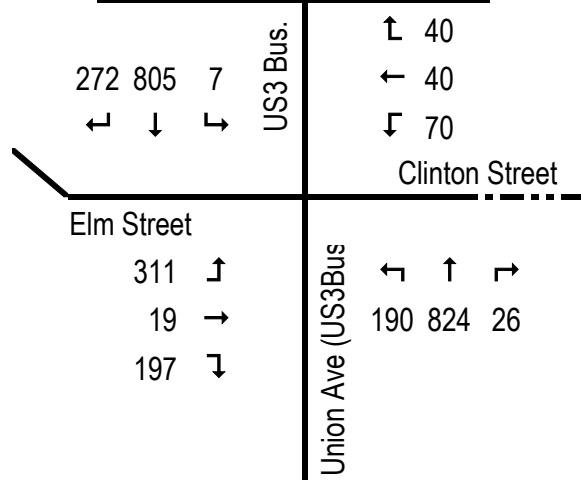
PM 2037 No-Build Volumes



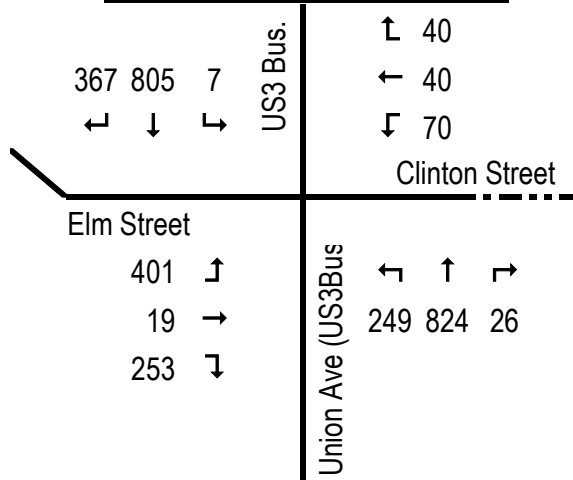
PM 2037 Full Build Volumes



SAT 2037 No-Build Volumes



SAT 2037 Full Build Volumes



Summary of Operating Conditions

Intersection #13: Union Ave (US3Bus) at Elm St / Clinton St [Signalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Conc Peds				2037 Build Mitigation: Non-Constrained			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	0.88	35.9	D	---	1.86	>300	F	---	1.04	52.3	D	---	0.93	38.8	D	---
EB	---	35.0	D	389	---	92.1	F	570	---	60.5	E	495	---	41.0	D	385
WB	---	27.6	C	178	---	70.0	E	252	---	30.1	C	170	---	58.8	E	206
NB	---	33.2	C	525	---	>300	F	398	---	43.4	D	440	---	37.6	D	314
SB	---	42.3	D	564	---	141.1	F	675	---	56.7	E	545	---	32.1	C	195
PM Peak OVERALL	1.24	119.0	F	---	1.61	177.3	F	---	1.41	131.1	F	---	0.95	50.2	D	---
EB	---	122.9	F	564	---	213.9	F	724	---	129.2	F	676	---	56.9	E	586
WB	---	105.2	F	249	---	>300	F	274	---	61.6	E	226	---	77.2	E	239
NB	---	71.4	F	1008	---	97.0	F	1008	---	72.7	E	907	---	36.7	D	513
SB	---	177.7	F	1002	---	164.5	F	1002	---	210.5	F	1026	---	57.3	E	463
SAT Peak OVERALL	1.53	269.9	F	---	1.78	264.2	F	---	1.38	128.0	F	---	0.89	51.5	D	---
EB	---	33.8	C	468	---	73.7	E	631	---	136.9	F	677	---	44.3	D	551
WB	---	23.4	C	163	---	26.0	C	194	---	77.8	E	264	---	75.4	E	264
NB	---	66.3	E	1096	---	67.1	E	1096	---	44.7	D	901	---	26.6	C	329
SB	---	>300	F	1335	---	>300	F	1336	---	208.1	F	1207	---	75.9	E	558

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service – ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians

Intersection #13: Union Ave (US3Bus) at Elm St / Clinton St	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	2182	257	10.5%
PM Peak Hour	2993	297	9.0%
SAT Peak Hour	2801	300	9.7%

Analysis

Intersection is near capacity in existing AM conditions, and significantly over capacity in PM and Saturday peak hours. Limited ROW does not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. This intersection is unlikely to be improved by coordination.

Recommended Mitigation

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

Alternate Mitigation Options

The city asked for two mitigation options. One was eliminating parking to the east along the NB approach and extending the NBL lane back to the TWLTL for a total of 400' of storage lane. The NBL modification does not change LOS or operations at the signal. See results in

Appendix L. However, it does improve queuing at the northbound approach. The other option is a non-constraining solution to the intersection. This would require two through lanes in both the NB and SB directions to process the volumes through the intersection. This is not reasonable due to ROW and physical conflicts.

Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave

Existing Conditions

This is an existing 4-way signalized intersection (City jurisdiction).

Union Street (US3Bus) forms the NB and SB approaches with Rite Aid forming the EB approach and Gilford Ave forming the WB approach.

All approaches accommodate two-way traffic. The EB Rite Aid driveway and WB Gilford Ave each have a left/thru lane and a right turn lane. NB has three lanes, an exclusive left turn lane, a thru lane and an exclusive right turn lane. SB provides an exclusive left turn lane and a thru/right lane.

The City speed limit is 30 mph. There is a cobra-head streetlight on a utility pole at the NE corner of the intersection. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.



Accident Evaluation

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. The crash experience for this intersection is relatively low.

Crash Data Summary Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave

CRASH FREQUENCY	
Total Crashes	15
Crashes per Year (Avg)	3.75
CRASH SEVERITY	
Property Damage Only	11
Injury	4
Fatalities	0
CRASH TYPE	
Fixed Object/Ditch	1
Other Motor Vehicle	14
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	0
Snow/Ice	1
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	1
Weekday PM (3-6pm)	2
Non-Commuter Peak	12



AM Total Site Trips

			Union Ave (US3 Bus)			
0	13	11		↑	4	
↓				↑	0	
↓				↓	4	
				Gilford Ave		
Rite Aid				↑	↑	↑
0	0	↑		0	10	2
0	0	→				
0	0	↓				
			Union Ave (US3 Bus)			

AM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			Union Ave (US3 Bus)			
0	11	11		↑	0	4
0	2	0		↑	0	0
↓				↓	0	0
				Gilford Ave		
Rite Aid				↑	↑	↑
0	0	↑		0	6	0
0	0	→		0	4	0
0	0	↓				2
			Union Ave (US3 Bus)			

PM Total Site Trips

			Union Ave (US3 Bus)			
0	7	39		↑	25	
↓				↑	0	
↓				↓	36	
				Gilford Ave		
Rite Aid				↑	↑	↑
0	0	↑		0	10	38
0	0	→				
0	0	↓				
			Union Ave (US3 Bus)			

PM Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			Union Ave (US3 Bus)			
0	5	5		↑	17	8
0	2	34		↑	0	0
↓				↓	19	0
				Gilford Ave		
Rite Aid				↑	↑	↑
0	0	↑		0	2	21
0	0	→		0	8	0
0	0	↓				17
			Union Ave (US3 Bus)			

SAT Total Site Trips

			Union Ave (US3 Bus)			
0	5	34		↑	27	
↓				↑	0	
↓				↓	35	
				Gilford Ave		
Rite Aid				↑	↑	↑
0	0	↑		0	5	22
0	0	→				
0	0	↓				
			Union Ave (US3 Bus)			

SAT Site Composition Trips

Primary, Pass-by, Diverted Link, Residential

			Union Ave (US3 Bus)			
0	0	26		↑	0	27
0	5	8		↑	0	0
↓				↓	9	17
				Gilford Ave		
Rite Aid				↑	↑	↑
0	0	↑		0	5	0
0	0	→		0	0	13
0	0	↓				9
			Union Ave (US3 Bus)			

AM 2037 No-Build Volumes

			Union Ave (US3 Bus)			
1	394	183		↑	302	
←	↓	↘		←	0	
				↓	468	
				Gilford Ave		
Rite Aid						
	8	↑		←	↑	↘
	2	→		1	605	178
	1	↓		Union Ave (US3 Bus)		

AM 2037 Full Build Volumes

			Union Ave (US3 Bus)			
1	407	194		↑	306	
←	↓	↘		←	0	
				↓	472	
				Gilford Ave		
Rite Aid						
	8	↑		←	↑	↘
	2	→		1	615	180
	1	↓		Union Ave (US3 Bus)		

PM 2037 No-Build Volumes

			Union Ave (US3 Bus)			
10	673	230		↑	287	
←	↓	↘		←	8	
				↓	272	
				Gilford Ave		
Rite Aid						
	3	↑		←	↑	↘
	20	→		1	714	374
	1	↓		Union Ave (US3 Bus)		

PM 2037 Full Build Volumes

			Union Ave (US3 Bus)			
10	680	269		↑	312	
←	↓	↘		←	8	
				↓	308	
				Gilford Ave		
Rite Aid						
	3	↑		←	↑	↘
	20	→		1	724	412
	1	↓		Union Ave (US3 Bus)		

SAT 2037 No-Build Volumes

			Union Ave (US3 Bus)			
5	606	139		↑	199	
←	↓	↘		←	8	
				↓	195	
				Gilford Ave		
Rite Aid						
	9	↑		←	↑	↘
	8	→		3	721	220
	4	↓		Union Ave (US3 Bus)		

SAT 2037 Full Build Volumes

			Union Ave (US3 Bus)			
5	611	173		↑	226	
←	↓	↘		←	8	
				↓	230	
				Gilford Ave		
Rite Aid						
	9	↑		←	↑	↘
	8	→		3	726	242
	4	↓		Union Ave (US3 Bus)		

Summary of Operating Conditions

Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave [Signalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Conc Peds				2037 Build Mitigation: Non-Constrained			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	1.00	85.0	F		1.06	109.1	F		0.96	55.6	E		0.82	35.4	D	----
EB	---	26.7	C	24	---	29.2	C	24	---	21.4	C	19	---	17.5	B	14
WB	---	186.7	F	800	---	218.2	F	806	---	49.8	D	656	---	35.1	D	515
NB	---	31.5	C	774	---	47.3	D	790	---	64.8	E	799	---	28.7	C	207
SB	---	21.6	C	407	---	33.4	C	422	---	54.2	D	430	---	42.9	D	282
PM Peak OVERALL	0.81	39.0	D		0.88	45.4	D		0.95	40.3	D		0.84	33.5	C	---
EB	---	37.9	D	49	---	38.6	D	49	---	22.1	C	30	---	28.7	C	31
WB	---	57.6	E	526	---	75.7	E	616	---	33.8	C	344	---	40.7	D	370
NB	---	32.1	C	919	---	32.3	C	940	---	33.8	C	669	---	24.5	C	390
SB	---	35.3	D	897	---	40.5	D	914	---	52.6	D	659	---	39.1	D	357
SAT Peak OVERALL	0.81	38.1	D		0.88	48.9	D		0.85	32.6	C		0.71	27.4	C	
EB	---	26.5	C	33	---	27.3	C	33	---	24.4	C	27	---	28.1	C	18
WB	---	33.5	C	305	---	39.1	D	374	---	32.7	C	269	---	35.1	D	26
NB	---	47.7	D	996	---	64.4	E	1005	---	32.8	C	803	---	23.9	C	284
SB	---	28.8	C	800	---	36.3	D	809	---	32.5	C	633	---	27.2	C	232

^a Volume-to capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians; MIT Coord: Coordinates intersections #18 and #21 with concurrent peds

Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	2143	44	2.0%
PM Peak Hour	2593	155	6.0%
SAT Peak Hour	2117	128	5.7%

Analysis

Site-related trips account for only a few percent of traffic at this intersection. Limited ROW does not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. Coordination with the intersection with the signal #21 at Church/Winter could improve progression of traffic through the area, but it does not eliminate LOS failures.

Recommended Mitigation

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- Coordinate signal with adjacent intersection: 21. Union Ave at Church/Winter St.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

Alternate Mitigation Option

- The city asked for consideration of coordinating this intersection with #21 Church/Winter to the south. A non-constrained option that would eliminate all failing LOS at the intersection and prevent queuing between Intersection. The intersections as a pair cannot process the through volumes with single NB and SB lanes, two through lanes are needed in both directions on the mainline to accommodate traffic volumes. See Intersection #21 for a complete explanation of the proposal for the modifications of the two intersections and the aerial layout in Appendix Q.

Intersection #21

Union Ave (US3Bus) at Church St / Winter St / Davis Place

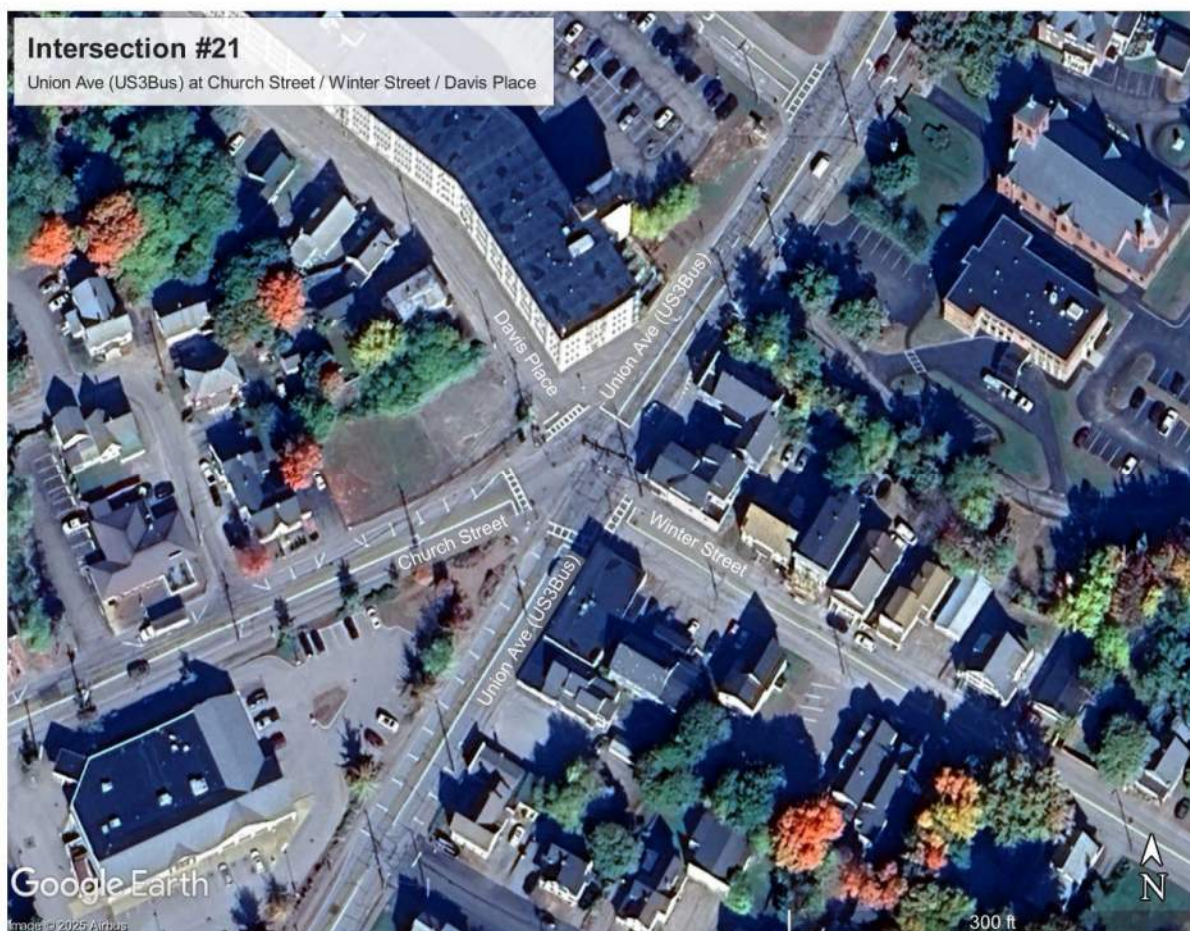
Existing Conditions

This is an existing 5-way signalized intersection (City jurisdiction).

Union Street (US3Bus) forms the NB and SB approaches with Church Street forming the EB approach and Winter Street forming the WB approach. Davis Place forms the fifth leg of the SEB approach.

All approaches accommodate two-way traffic. The EB/WB/NB/SEB all have a single lane approach. SB provides an exclusive right turn lane and a thru/left lane.

The City speed limit is 30 mph. There are cobra-head streetlights on a utility pole at the NE and NW (south of Davis Pl) corners of the intersection and a street lamp pole between Union NB and Church St. There are pedestrian crosswalks with pedestrian signals and push buttons at all four of the intersection approaches, except for no crosswalk at the SB approach of Union St. There is an exclusive pedestrian signal phase.



Accident Evaluation

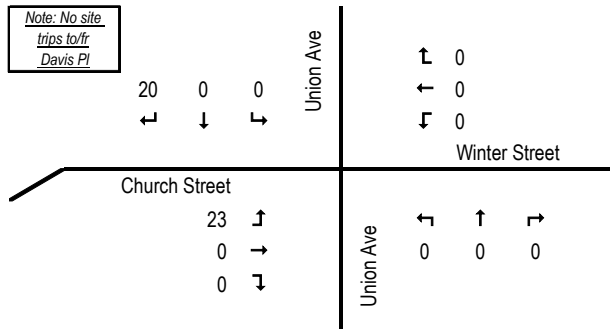
Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Considering the complex intersection geometry and traffic volumes, the crash experience for this intersection is relatively low.

Crash Data Summary
Intersection #21: Union Ave (US3Bus) at Church St / Winter St / Davis Pl

CRASH FREQUENCY	
Total Crashes	11
Crashes per Year (Avg)	2.75
CRASH SEVERITY	
Property Damage Only	8
Injury	3
Fatalities	0
CRASH TYPE	
Fixed Object	1
Other Motor Vehicle	10
Animal	0
WEATHER	
Sun Glare	0
Rain/Wet	2
Snow/Ice	1
WEEKDAY COMMUTER PEAK	
Weekday AM (6-9am)	0
Weekday PM (3-6pm)	3
Non-Commuter Peak	8

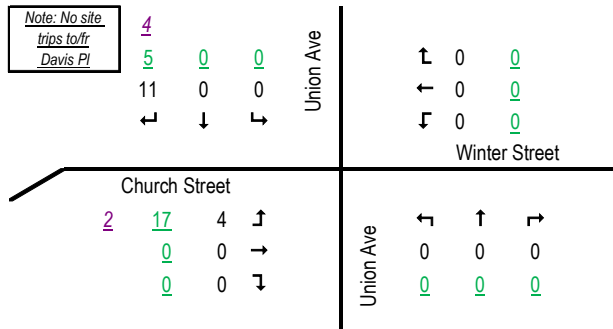


AM Total Site Trips

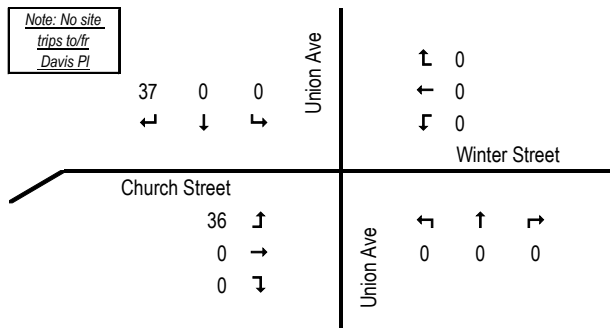


AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

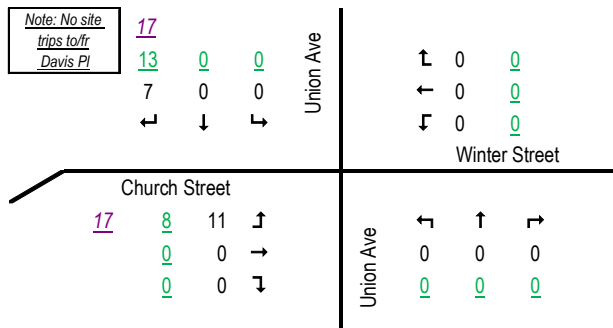


PM Total Site Trips

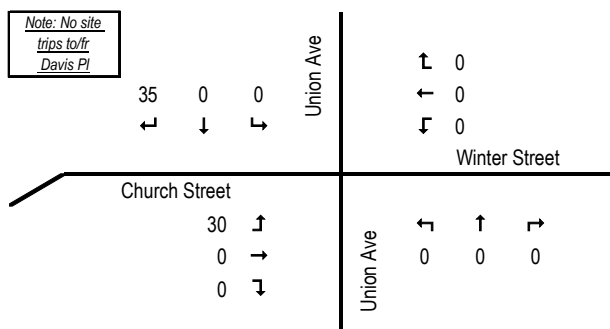


PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*

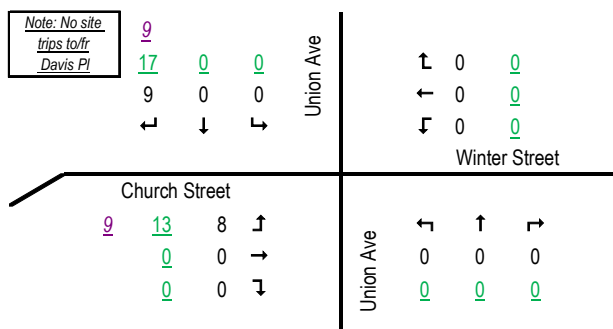


SAT Total Site Trips



SAT Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, *Residential*



AM 2037 No-Build Volumes

Note: No site trips to/fr			Union Ave			
138	390	2		↑	7	
←	↓	↘		←	25	
				↓	6	
				Winter Street		
Church Street			Union Ave	←	↑	↘
138	↑			1	405	4
12	→					
7	↘					

AM 2037 Full Build Volumes

Note: No site trips to/fr			Union Ave			
158	390	2		↑	7	
←	↓	↘		←	25	
				↓	6	
				Winter Street		
Church Street			Union Ave	←	↑	↘
161	↑			1	405	4
12	→					
7	↘					

PM 2037 No-Build Volumes

Note: No site trips to/fr			Union Ave			
186	506	4		↑	14	
←	↓	↘		←	31	
				↓	13	
				Winter Street		
Church Street			Union Ave	←	↑	↘
272	↑			1	531	20
28	→					
5	↘					

PM 2037 Full Build Volumes

Note: No site trips to/fr			Union Ave			
223	506	4		↑	14	
←	↓	↘		←	31	
				↓	13	
				Winter Street		
Church Street			Union Ave	←	↑	↘
308	↑			1	531	20
28	→					
5	↘					

SAT 2037 No-Build Volumes

Note: No site trips to/fr			Union Ave			
104	424	5		↑	6	
←	↓	↘		←	13	
				↓	9	
				Winter Street		
Church Street			Union Ave	←	↑	↘
179	↑			6	512	4
31	→					
7	↘					

SAT 2037 Full Build Volumes

Note: No site trips to/fr			Union Ave			
139	424	5		↑	6	
←	↓	↘		←	13	
				↓	9	
				Winter Street		
Church Street			Union Ave	←	↑	↘
209	↑			6	512	4
31	→					
7	↘					

Summary of Operating Conditions

Intersection #21: Union Ave (US3Bus) at Church St / Winter St / Davis Pl [Signalized]

Approach	2037 No-Build				2037 Build				2037 Build Mitigation: Conc Peds				2037 Build Mitigation: Non-Constrained			
	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d	v/c ^a	Del ^b	LOS ^c	Q ^d
AM Peak OVERALL	0.98	66.1	E	---	1.14	94.0	F	---	1.16	82.0	F	---	0.52	21.4	C	---
EB	---	286.4	F	407	---	>300	F	468	---	298.4	F	391	---	44.4	D	140
WB	---	41.6	D	71	---	41.1	D	71	---	58.9	E	69	---	67.8	E	82
NB	---	31.7	C	452	---	33.2	C	453	---	45.9	D	565	---	20.0	C	349
SB	---	27.6	C	429	---	28.5	C	429	---	38.2	D	530	---	10.5	B	221
SEB	---	42.9	D	37	---	42.4	D	37	---	54.0	D	36	---	48.1	D	31
PM Peak OVERALL	1.38	215.4	F	---	1.50	262.1	F	---	1.60	198.8	F	---	0.71	32.9	C	---
EB	---	>300	F	658	---	>300	F	737	---	>300	F	583	---	62.4	E	306
WB	---	49.5	D	95	---	49.6	D	95	---	81.8	F	123	---	51.4	D	116
NB	---	37.2	D	720	---	37.2	D	720	---	135.1	F	839	---	39.1	D	607
SB	---	28.4	C	542	---	28.3	C	542	---	48.5	D	649	---	10.8	B	209
SEB	---	50.4	D	0	---	50.4	D	0	---	50.2	D	0	---	50.2	D	0
SAT Peak OVERALL	0.81	53.2	D	---	0.88	70.0	E	---	0.89	53.2	D	---	0.52	18.2	B	---
EB	---	202.1	F	444	---	281.7	F	510	---	133.1	F	447	---	42.8	D	147
WB	---	45.9	D	0	---	45.8	D	0	---	48.9	D	0	---	45.3	D	0
NB	---	25.0	C	562	---	25.1	C	562	---	41.3	D	676	---	18.8	B	544
SB	---	20.6	C	434	---	20.4	C	434	---	29.6	C	502	---	5.6	A	164
SEB	---	48.4	D	12	---	48.4	D	12	---	51.4	D	13	---	47.6	D	11

^a Volume-to-capacity ratio – ^b Average control delay (sec/veh) – ^c Level of Service ^d Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians; MIT Coord: Coordinates intersections #18 and #21 with concurrent peds

Intersection #21: Union Ave (US3Bus) at Church St / Winter St / Davis Pl	Total Background Volume	Added Site Trips	% Added to Intersection
AM Peak Hour	1154	43	3.6%
PM Peak Hour	1644	73	4.3%
SAT Peak Hour	1306	65	4.7%

Analysis

Site-related trips account for only a few percent of traffic at this intersection. Limited ROW does not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing benefits intersection operations but do not eliminate LOS failures.

Recommended Mitigation

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- Coordinate signal with adjacent intersection: 18. Union Ave at Gilford Ave.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

Alternate Mitigation Option

- The city asked for consideration of coordinating this intersection with #18 Gilford Ave/Rite Aid to the north. A non-constrained option that would eliminate all failing LOS at the intersection and prevent queuing between Intersection. The intersections as a pair cannot process the through volumes with single NB and SB lanes, two through lanes are needed in both directions on the mainline to accommodate traffic volumes. The proposal shows two lanes in each direction between the two intersections, as well as two lanes heading northbound at Church Street. At the Gilford Road intersection, includes two northbound lanes and two southbound lanes to accommodate volumes. Gilford Ave swaps lane assignments to incorporate an exclusive left turn lane. See the aerial layout in Appendix Q.

END OF PART B

ATTACHMENTS – Part B (Updated Rev1)

City Intersection Analysis

Attachments

ATTACHMENT A	<u>Volumes (Peak)</u> (No Change Rev1) • Calculations
ATTACHMENT B	<u>Adjustment</u> (No Change Rev1) • Seasonal • Growth • Heavy Vehicles
ATTACHMENT C	<u>Timings</u> (No Change Rev1)
ATTACHMENT D	<u>Crash Data</u> (No Change Rev1) • Summary • NHDOT raw data
ATTACHMENT E	<u>Pedestrians</u> (No Change Rev1) • Tabulations • Counts
ATTACHMENT F	<u>Intersection #14: Synchro/SIDRA (AM/PM/SAT)</u> (Updated Rev1) • 2037 No-Build (Synchro) • 2037 Build (Synchro) • 2037 Build Mit (Synchro/SIDRA)
ATTACHMENT G	<u>Intersection #15: Synchro (AM/PM/SAT)</u> (Updated Rev1) • 2037 No-Build • 2037 Build • 2037 Build Mit • 2037 Build Mit Non-Constrained
ATTACHMENT H	<u>Intersection #19: Synchro (AM/PM/SAT)</u> (No Change Rev1) • 2037 No-Build • 2037 Build • 2037 Build Mit
ATTACHMENT I	<u>Intersection #16: Synchro (AM/PM/SAT)</u> (Updated Rev1) • 2037 No-Build • 2037 Build • 2037 Build Mit • 2037 Build Mit Non-Constrained (#16 & #19)
ATTACHMENT J	<u>Intersection #17: Synchro (AM/PM/SAT)</u> (No Change Rev1) • 2037 No-Build • 2037 Build • 2037 Build Mit

ATTACHMENT K	<u>Intersection #20: Synchro (AM/PM/SAT) (No Change Rev1)</u> • 2037 No-Build • 2037 Build • 2037 Build Mit
ATTACHMENT L	<u>Intersection #13: Synchro (AM/PM/SAT) (Updated Rev1)</u> • 2037 No-Build • 2037 Build • 2037 Build Mit • 2037 Build Mit – NBL • 2037 Build Mit Non-Constrained
ATTACHMENT M	<u>Intersection #18: Synchro (AM/PM/SAT) (No Change Rev1)</u> • 2037 No-Build • 2037 Build • 2037 Build Mit
ATTACHMENT N	<u>Intersection #21: Synchro (AM/PM/SAT) (No Change Rev1)</u> • 2037 No-Build • 2037 Build • 2037 Build Mit
ATTACHMENT O	<u>Intersections #18 & #21 Coord: Synchro (AM/PM/SAT) (Updated Rev1)</u> • 2037 Build Mit Coord • 2037 Build Mit Coord with Lanes
ATTACHMENT P	<u>Warrants (#19) (No Change Rev1)</u> • Volumes (Ave) • Diagrams • Turn Warrant Tables • Left Turn Lane Warrant • Right Turn Lane Warrant • Second Lane on Minor Road Warrant • Peak Hour Signal Warrant
ATTACHMENT Q	<u>Aerial Intersection Overlays</u> • #14 Parade Rd / N. Main St at Lexington – Signal • #14 Parade Rd / N. Main St at Lexington – Roundabout • #15 N. Main St at Oak St ➢ Oak Street Sightline photos • #19 & #16 N. Main St at New Salem St and Veterans Sq/Church St • #13 Union Street at Elm St/Clinton St – NBL • #13 Union Street at Elm St/Clinton St – Non-Constrained • #18 & #21 Gilford Ave / Rite Aid and Union Street at Church/Winter

ATTACHMENT F (Updated Rev1)

Intersection #14: Synchro/SIDRA (AM/PM/SAT)

2037 No-Build (Synchro)

2037 Build (Synchro)

2037 Build Mit (Synchro/SIDRA)

Lanes, Volumes, Timings
14: Parade Rd (NH106) & Lexington Dr

AM 2037 NB
Timing Plan: NHDOT/City

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	79	93	258	510	640	139
Future Volume (vph)	79	93	258	510	640	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	4280	
Travel Time (s)	34.1			132.0	97.3	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	87	102	287	567	865	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Sign Control	Stop			Free	Free	Corrected: 15mph Left, 9mph Right

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

14: Parade Rd (NH106) & Lexington Dr

AM 2037 NB
Timing Plan: NHDOT/City

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	79	93	258	510	640	139
Future Volume (Veh/h)	79	93	258	510	640	139
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	87	102	287	567	711	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1929	788	865			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1929	788	865			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	74	63			
cM capacity (veh/h)	46	391	770			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	87	102	287	567	865	
Volume Left	87	0	287	0	0	
Volume Right	0	102	0	0	154	
cSH	46	391	770	1700	1700	
Volume to Capacity	1.90	0.26	0.37	0.33	0.51	
Queue Length 95th (ft)	221	26	43	0	0	
Control Delay (s)	616.4	17.4	12.4	0.0	0.0	
Lane LOS	F	C	B			
Approach Delay (s)	293.2		4.2		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			30.9			
Intersection Capacity Utilization			70.8%	ICU Level of Service		C
Analysis Period (min)			15			

Lanes, Volumes, Timings
14: Parade Rd (NH106) & Lexington Dr

PM 2037 NB
Timing Plan: NHDOT/City

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	276	499	81	652	624	81
Future Volume (vph)	276	499	81	652	624	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	4280	
Travel Time (s)	34.1			132.0	97.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	2%	2%	1%	1%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	307	554	90	724	775	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Sign Control	Stop			Free	Free	Corrected: 15mph Left, 9mph Right

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

14: Parade Rd (NH106) & Lexington Dr

PM 2037 NB
Timing Plan: NHDOT/City

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	276	499	81	652	624	81
Future Volume (Veh/h)	276	499	81	652	624	81
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	307	554	90	724	686	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1634	730	775			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1634	730	775			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	0	89			
cM capacity (veh/h)	99	422	845			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	307	554	90	724	775	
Volume Left	307	0	90	0	0	
Volume Right	0	554	0	0	89	
cSH	99	422	845	1700	1700	
Volume to Capacity	3.09	1.31	0.11	0.43	0.46	
Queue Length 95th (ft)	Err	621	9	0	0	
Control Delay (s)	Err	183.9	9.8	0.0	0.0	
Lane LOS	F	F	A			
Approach Delay (s)	3683.6		1.1		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			1294.9			
Intersection Capacity Utilization			75.3%	ICU Level of Service		D
Analysis Period (min)			15			

Lanes, Volumes, Timings
14: Parade Rd (NH106) & Lexington Dr

SAT 2037 NB
Timing Plan: NHDOT/City

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	86	146	32	388	410	30
Future Volume (vph)	86	146	32	388	410	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	4280	
Travel Time (s)	34.1			132.0	97.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	162	36	431	489	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9	15			9
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					

HCM Unsignalized Intersection Capacity Analysis

14: Parade Rd (NH106) & Lexington Dr

SAT 2037 NB
Timing Plan: NHDOT/City

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	86	146	32	388	410	30
Future Volume (Veh/h)	86	146	32	388	410	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	96	162	36	431	456	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	976	472	489			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	976	472	489			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	73	97			
cM capacity (veh/h)	271	594	1079			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	96	162	36	431	489	
Volume Left	96	0	36	0	0	
Volume Right	0	162	0	0	33	
cSH	271	594	1079	1700	1700	
Volume to Capacity	0.35	0.27	0.03	0.25	0.29	
Queue Length 95th (ft)	39	28	3	0	0	
Control Delay (s)	25.4	13.3	8.5	0.0	0.0	
Lane LOS	D	B	A			
Approach Delay (s)	17.8		0.7		0.0	
Approach LOS	C					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			39.1%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
14: Parade Rd (NH106) & Lexington Dr

AM 2037 B
Timing Plan: NHDOT/City

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	146	93	258	708	968	201
Future Volume (vph)	146	93	258	708	968	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	4280	
Travel Time (s)	34.1			132.0	97.3	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	102	287	787	1299	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Sign Control	Stop			Free	Free	Corrected: 15mph Left, 9mph Right

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

14: Parade Rd (NH106) & Lexington Dr

AM 2037 B
Timing Plan: NHDOT/City

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	146	93	258	708	968	201
Future Volume (Veh/h)	146	93	258	708	968	201
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	160	102	287	787	1076	223
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2548	1188	1299			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2548	1188	1299			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	56	46			
cM capacity (veh/h)	13	229	527			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	160	102	287	787	1299	
Volume Left	160	0	287	0	0	
Volume Right	0	102	0	0	223	
cSH	13	229	527	1700	1700	
Volume to Capacity	11.91	0.44	0.54	0.46	0.76	
Queue Length 95th (ft)	Err	53	81	0	0	
Control Delay (s)	Err	32.7	19.7	0.0	0.0	
Lane LOS	F	D	C			
Approach Delay (s)	6119.0		5.3		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			610.6			
Intersection Capacity Utilization			95.5%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings
14: Parade Rd (NH106) & Lexington Dr

PM 2037 B
Timing Plan: NHDOT/City

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	341	499	81	1015	967	155
Future Volume (vph)	341	499	81	1015	967	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	4280	
Travel Time (s)	34.1			132.0	97.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	2%	2%	1%	1%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	554	90	1128	1233	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Sign Control	Stop			Free	Free	Corrected: 15mph Left, 9mph Right

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

14: Parade Rd (NH106) & Lexington Dr

PM 2037 B
Timing Plan: NHDOT/City

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	341	499	81	1015	967	155
Future Volume (Veh/h)	341	499	81	1015	967	155
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	379	554	90	1128	1063	170
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2456	1148	1233			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2456	1148	1233			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	0	84			
cM capacity (veh/h)	28	242	569			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	379	554	90	1128	1233	
Volume Left	379	0	90	0	0	
Volume Right	0	554	0	0	170	
cSH	28	242	569	1700	1700	
Volume to Capacity	13.31	2.29	0.16	0.66	0.73	
Queue Length 95th (ft)	Err	1094	14	0	0	
Control Delay (s)	Err	625.6	12.5	0.0	0.0	
Lane LOS	F	F	B			
Approach Delay (s)	4433.3		0.9		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			1222.6			
Intersection Capacity Utilization			97.9%	ICU Level of Service		F
Analysis Period (min)			15			

Lanes, Volumes, Timings
14: Parade Rd (NH106) & Lexington Dr

SAT 2037 B
Timing Plan: NHDOT/City

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	139	146	32	615	629	80
Future Volume (vph)	139	146	32	615	629	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	4280	
Travel Time (s)	34.1			132.0	97.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	162	36	683	788	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Sign Control	Stop			Free	Free	Corrected: 15mph Left, 9mph Right

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

14: Parade Rd (NH106) & Lexington Dr

SAT 2037 B
Timing Plan: NHDOT/City

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	139	146	32	615	629	80
Future Volume (Veh/h)	139	146	32	615	629	80
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	154	162	36	683	699	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1498	744	788			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1498	744	788			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	61	96			
cM capacity (veh/h)	130	416	836			
Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	
Volume Total	154	162	36	683	788	
Volume Left	154	0	36	0	0	
Volume Right	0	162	0	0	89	
cSH	130	416	836	1700	1700	
Volume to Capacity	1.19	0.39	0.04	0.40	0.46	
Queue Length 95th (ft)	232	45	3	0	0	
Control Delay (s)	204.3	19.0	9.5	0.0	0.0	
Lane LOS	F	C	A			
Approach Delay (s)	109.3		0.5		0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			19.1			
Intersection Capacity Utilization			53.7%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
14: N.Main St/Parade Rd (NH106) & Lexington Dr

AM 2037 B-MIT
Timing Plan: MIT

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	146	93	258	708	968	201
Future Volume (vph)	146	93	258	708	968	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			200
Storage Lanes	1	1	1			1
Taper Length (ft)	100		100			
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	3280	
Travel Time (s)	34.1			132.0	74.5	
Peak Hour Factor	0.91	0.91	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	160	102	287	787	1299	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Turn Type	Prot	pm+ov	Prot	NA	NA	
Protected Phases	4	5	5	2	6	
Permitted Phases		4				
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	
Total Split (s)	17.0	26.0	26.0	73.0	47.0	
Total Split (%)	18.9%	28.9%	28.9%	81.1%	52.2%	
Maximum Green (s)	11.0	20.0	20.0	67.0	41.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Min	Min	
v/c Ratio	0.61	0.14	0.71	0.57	0.79	
Control Delay	46.1	9.0	41.2	6.3	22.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.1	9.0	41.2	6.3	22.5	
Queue Length 50th (ft)	87	16	148	144	300	
Queue Length 95th (ft)	#162	45	236	217	390	
Internal Link Dist (ft)	1420			5730	3200	
Turn Bay Length (ft)	1000		250			

Lanes, Volumes, Timings
 14: N.Main St/Parade Rd (NH106) & Lexington Dr

AM 2037 B-MIT

Timing Plan: MIT

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Base Capacity (vph)	281	768	468	1514	1834	
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	0.57	0.13	0.61	0.52	0.71	

Intersection Summary

Area Type: Other

Cycle Length: 90

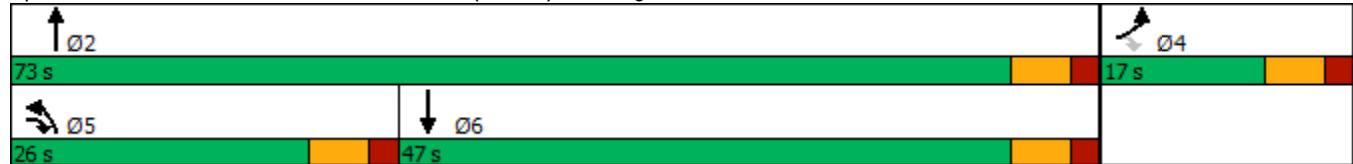
Actuated Cycle Length: 83.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 14: N.Main St/Parade Rd (NH106) & Lexington Dr



HCM Signalized Intersection Capacity Analysis

14: N.Main St/Parade Rd (NH106) & Lexington Dr

AM 2037 B-MIT

Timing Plan: MIT

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	146	93	258	708	968	201
Future Volume (vph)	146	93	258	708	968	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1736	1827	3448	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1736	1827	3448	
Peak-hour factor, PHF	0.91	0.91	0.90	0.90	0.90	0.90
Adj. Flow (vph)	160	102	287	787	1076	223
RTOR Reduction (vph)	0	33	0	0	19	0
Lane Group Flow (vph)	160	69	287	787	1280	0
Heavy Vehicles (%)	2%	2%	4%	4%	2%	2%
Turn Type	Prot	pm+ov	Prot	NA	NA	
Protected Phases	4	5	5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	10.3	27.5	17.2	60.5	37.3	
Effective Green, g (s)	12.3	31.5	19.2	62.5	39.3	
Actuated g/C Ratio	0.15	0.38	0.23	0.75	0.47	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	262	678	402	1379	1636	
v/s Ratio Prot	c0.09	0.02	c0.17	0.43	c0.37	
v/s Ratio Perm		0.02				
v/c Ratio	0.61	0.10	0.71	0.57	0.78	
Uniform Delay, d1	33.0	16.5	29.3	4.4	18.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.2	0.1	5.9	0.6	2.5	
Delay (s)	37.2	16.6	35.2	4.9	20.7	
Level of Service	D	B	D	A	C	
Approach Delay (s)	29.2			13.0	20.7	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay			18.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			82.8		Sum of lost time (s)	12.0
Intersection Capacity Utilization			65.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
14: N.Main St/Parade Rd (NH106) & Lexington Dr

PM 2037 B-MIT
Timing Plan: MIT

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	341	499	81	1015	967	155
Future Volume (vph)	341	499	81	1015	967	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			200
Storage Lanes	1	1	1			1
Taper Length (ft)	100		100			
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	Corrected: 35mph NB/SB
Link Distance (ft)	1500			5810	3280	
Travel Time (s)	34.1			132.0	74.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	2%	2%	1%	1%	4%	4%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	379	554	90	1128	1233	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60 Corrected: 15mph Left, 9mph Right
Turn Type	Prot	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0	
Total Split (s)	27.0	27.0	14.0	63.0	49.0	
Total Split (%)	30.0%	30.0%	15.6%	70.0%	54.4%	
Maximum Green (s)	21.0	21.0	8.0	57.0	43.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Min	Min	
v/c Ratio	0.81	0.95	0.46	0.93	0.69	
Control Delay	46.5	47.6	45.7	29.1	18.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.5	47.6	45.7	29.1	18.7	
Queue Length 50th (ft)	204	200	49	491	268	
Queue Length 95th (ft)	#356	#417	97	#852	347	
Internal Link Dist (ft)	1420			5730	3200	
Turn Bay Length (ft)	1000		250			

Lanes, Volumes, Timings
 14: N.Main St/Parade Rd (NH106) & Lexington Dr

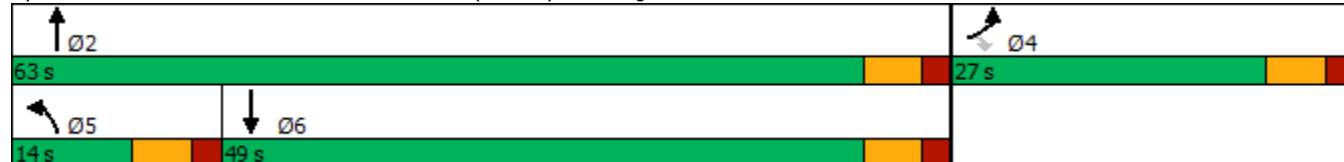
PM 2037 B-MIT
 Timing Plan: MIT

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Base Capacity (vph)	469	585	205	1278	1777	
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	0.81	0.95	0.44	0.88	0.69	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 87.2
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 14: N.Main St/Parade Rd (NH106) & Lexington Dr



HCM Signalized Intersection Capacity Analysis

14: N.Main St/Parade Rd (NH106) & Lexington Dr

PM 2037 B-MIT
Timing Plan: MIT

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	341	499	81	1015	967	155
Future Volume (vph)	341	499	81	1015	967	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1787	1881	3399	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1787	1881	3399	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.91	0.91
Adj. Flow (vph)	379	554	90	1128	1063	170
RTOR Reduction (vph)	0	166	0	0	14	0
Lane Group Flow (vph)	379	388	90	1128	1219	0
Heavy Vehicles (%)	2%	2%	1%	1%	4%	4%
Turn Type	Prot	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	21.1	21.1	6.2	55.4	43.2	
Effective Green, g (s)	23.1	23.1	8.2	57.4	45.2	
Actuated g/C Ratio	0.26	0.26	0.09	0.65	0.51	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	462	413	165	1219	1735	
v/s Ratio Prot	0.21		0.05	0.60	0.36	
v/s Ratio Perm		0.24				
v/c Ratio	0.82	0.94	0.55	0.93	0.70	
Uniform Delay, d1	30.7	32.0	38.4	13.7	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.1	28.9	3.7	11.8	1.3	
Delay (s)	41.9	61.0	42.0	25.5	17.8	
Level of Service	D	E	D	C	B	
Approach Delay (s)	53.2			26.7	17.8	
Approach LOS	D			C	B	
Intersection Summary						
HCM 2000 Control Delay			30.8		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.98			
Actuated Cycle Length (s)			88.5		Sum of lost time (s)	12.0
Intersection Capacity Utilization			79.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
14: N.Main St/Parade Rd (NH106) & Lexington Dr

SAT 2037 B-MIT
Timing Plan: MIT

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	139	146	32	615	629	80
Future Volume (vph)	139	146	32	615	629	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	1000	0	250			200
Storage Lanes	1	1	1			1
Taper Length (ft)	100		100			
Right Turn on Red		Yes				Yes
Link Speed (mph)	30			30	30	
Link Distance (ft)	1500			5810	3280	
Travel Time (s)	34.1			132.0	74.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	154	162	36	683	788	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60			60
Turn Type	Prot	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Detector Phase	4	4	5	2	6	
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	24.0	24.0	11.0	24.0	24.0	
Total Split (s)	28.0	28.0	13.0	62.0	49.0	
Total Split (%)	31.1%	31.1%	14.4%	68.9%	54.4%	
Maximum Green (s)	22.0	22.0	7.0	56.0	43.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?			Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	Min	Min	
Walk Time (s)	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0	
v/c Ratio	0.35	0.32	0.12	0.62	0.44	
Control Delay	20.3	6.0	23.5	9.7	10.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.3	6.0	23.5	9.7	10.4	
Queue Length 50th (ft)	31	0	8	106	51	

Corrected: 35mph NB/SB

Corrected: 15mph Left, 9mph Right

Lanes, Volumes, Timings
 14: N.Main St/Parade Rd (NH106) & Lexington Dr

SAT 2037 B-MIT
 Timing Plan: MIT

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 95th (ft)	101	41	38	227	162	
Internal Link Dist (ft)	1420			5730	3200	
Turn Bay Length (ft)	1000		250			
Base Capacity (vph)	887	875	332	1819	3111	
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	0.19	0.11	0.38	0.25	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 50.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated

Splits and Phases: 14: N.Main St/Parade Rd (NH106) & Lexington Dr

 Ø2	 Ø4
62 s	28 s
 Ø5	 Ø6
13 s	49 s

HCM Signalized Intersection Capacity Analysis

14: N.Main St/Parade Rd (NH106) & Lexington Dr

SAT 2037 B-MIT

Timing Plan: MIT

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	139	146	32	615	629	80
Future Volume (vph)	139	146	32	615	629	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1787	1599	1787	1881	3514	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1787	1599	1787	1881	3514	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	162	36	683	699	89
RTOR Reduction (vph)	0	125	0	0	12	0
Lane Group Flow (vph)	154	37	36	683	776	0
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%
Turn Type	Prot	Perm	Prot	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4				
Actuated Green, G (s)	10.3	10.3	2.2	31.8	23.6	
Effective Green, g (s)	12.3	12.3	4.2	33.8	25.6	
Actuated g/C Ratio	0.23	0.23	0.08	0.62	0.47	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	406	363	138	1175	1662	
v/s Ratio Prot	c0.09		0.02	c0.36	0.22	
v/s Ratio Perm		0.02				
v/c Ratio	0.38	0.10	0.26	0.58	0.47	
Uniform Delay, d1	17.7	16.5	23.5	6.0	9.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.1	1.0	0.7	0.2	
Delay (s)	18.3	16.7	24.5	6.7	9.8	
Level of Service	B	B	C	A	A	
Approach Delay (s)	17.4			7.6	9.8	
Approach LOS	B			A	A	
Intersection Summary						
HCM 2000 Control Delay			10.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.58			
Actuated Cycle Length (s)			54.1		Sum of lost time (s)	12.0
Intersection Capacity Utilization			46.7%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

LEVEL OF SERVICE

Lane Level of Service



Site: [14] 14-Lexington (CITY ROUNDABOUT)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

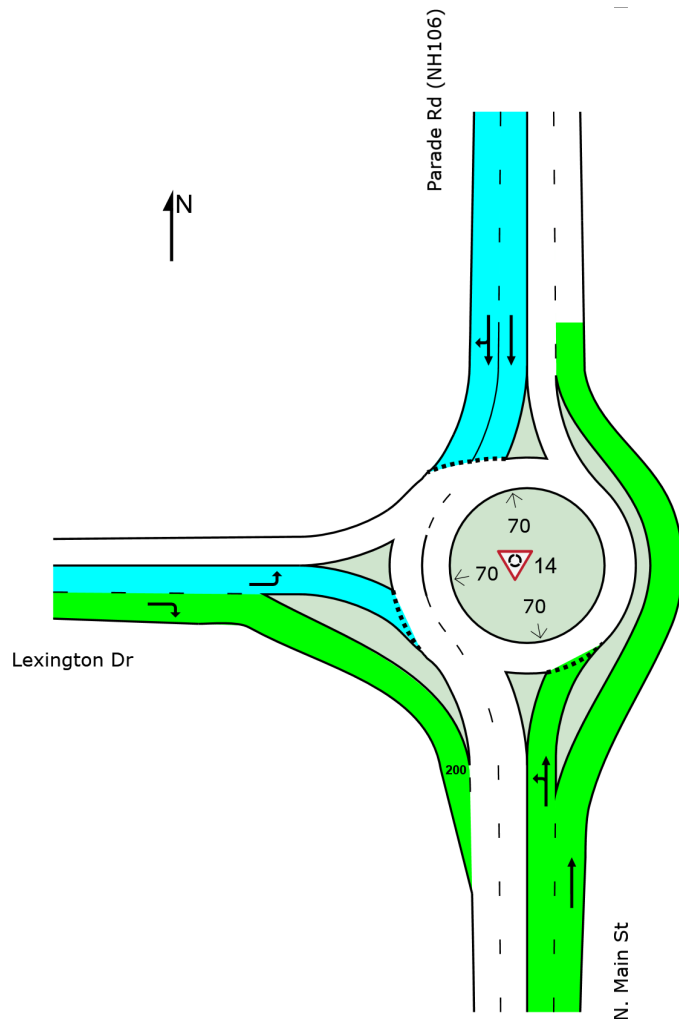
New Site

Site Category: (None)

Roundabout

Site Scenario: 3 | AM 2037 BUILD - 14 CITY

	Approaches			Intersection
	South	North	West	
LOS	A	B	A	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

LOS F will result if $v/c > 1$ irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 4:43:21 PM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [14] 14-Lexington (CITY ROUNDABOUT)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site
Site Category: (None)
Roundabout
Site Scenario: 3 | AM 2037 BUILD - 14 CITY

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV] veh/h	%	[Total HV] veh/h	%				[Veh. veh	Dist] ft				mph
South: N. Main St															
3	L2	All MCs	287	4.0	287	4.0	0.350	6.4	LOS A	1.8	46.7	0.37	0.20	0.37	26.8
8	T1	All MCs	787	4.0	787	4.0	0.350	1.1	LOS A	1.8	46.7	0.06	0.03	0.06	31.9
Approach			1073	4.0	1073	4.0	0.350	2.5	LOS A	1.8	46.7	0.14	0.08	0.14	30.4
North: Parade Rd (NH106)															
4	T1	All MCs	1076	2.0	1076	2.0	0.616	13.2	LOS B	6.6	166.4	0.68	0.59	0.95	28.0
14	R2	All MCs	223	2.0	223	2.0	0.616	11.6	LOS B	6.6	166.4	0.68	0.59	0.95	26.2
Approach			1299	2.0	1299	2.0	0.616	12.9	LOS B	6.6	166.4	0.68	0.59	0.95	27.7
West: Lexington Dr															
5	L2	All MCs	160	2.0	160	2.0	0.305	11.3	LOS B	1.1	28.4	0.69	0.72	0.78	25.0
12	R2	All MCs	102	2.0	102	2.0	0.062	2.7	LOS A	0.0	0.0	0.00	0.00	0.00	28.9
Approach			263	2.0	263	2.0	0.305	8.0	LOS A	1.1	28.4	0.42	0.44	0.48	26.4
All Vehicles			2635	2.8	2635	2.8	0.616	8.2	LOS A	6.6	166.4	0.44	0.36	0.57	28.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

LEVEL OF SERVICE

Lane Level of Service



Site: [14] 14-Lexington (CITY ROUNDABOUT)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

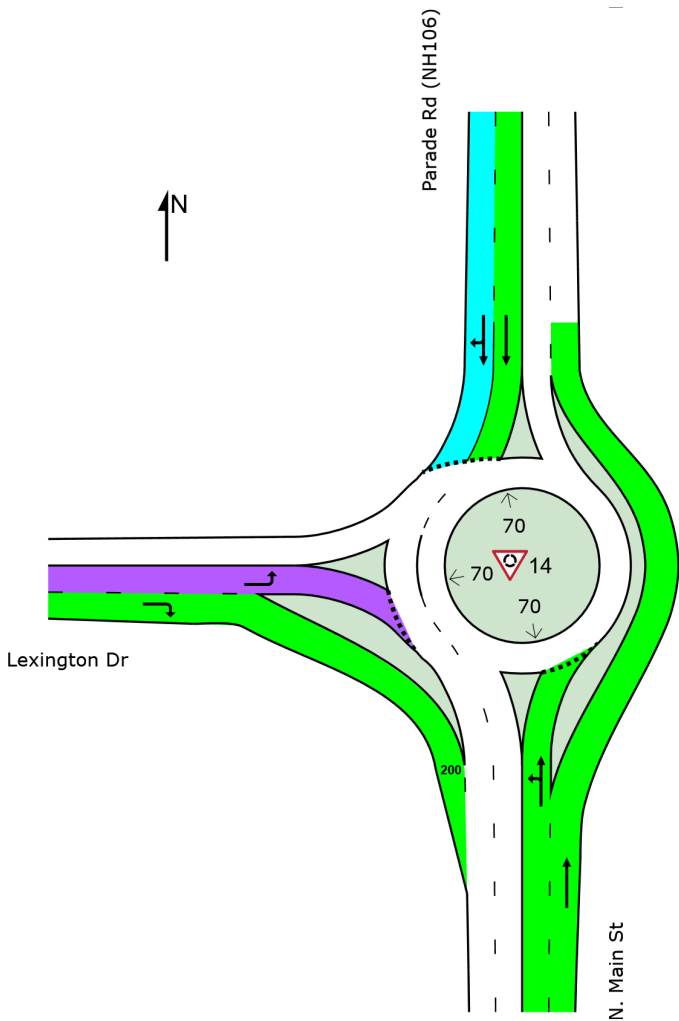
New Site

Site Category: (None)

Roundabout

Site Scenario: 2 | PM 2037 BUILD - 14 CITY

	Approaches			Intersection
	South	North	West	
LOS	A	A	B	A



Colour code based on Level of Service



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Roundabout Level of Service Method: Same as Sign Control

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 4:43:00 PM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [14] 14-Lexington (CITY ROUNDABOUT)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 2 | PM 2037 BUILD - 14 CITY

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]		[Total HV]					[Veh. veh	Dist] ft				
			veh/h	%	veh/h	%									
South: N. Main St															
3	L2	All MCs	90	1.0	90	1.0	0.414	8.2	LOS A	2.1	53.6	0.58	0.42	0.58	26.9
8	T1	All MCs	1128	1.0	1128	1.0	0.414	2.4	LOS A	2.1	53.6	0.16	0.12	0.16	31.5
Approach			1218	1.0	1218	1.0	0.414	2.9	LOS A	2.1	53.6	0.19	0.14	0.19	31.1
North: Parade Rd (NH106)															
4	T1	All MCs	1063	4.0	1063	4.0	0.492	9.8	LOS A	3.3	84.9	0.34	0.15	0.34	29.4
14	R2	All MCs	170	4.0	170	4.0	0.492	7.8	LOS A	3.3	84.9	0.34	0.15	0.34	27.5
Approach			1233	4.0	1233	4.0	0.492	9.5	LOS A	3.3	84.9	0.34	0.15	0.34	29.1
West: Lexington Dr															
5	L2	All MCs	379	2.0	379	2.0	0.726	26.3	LOS D	4.9	125.0	0.85	1.16	1.71	21.5
12	R2	All MCs	554	2.0	554	2.0	0.338	5.3	LOS A	0.0	0.0	0.00	0.00	0.00	28.8
Approach			933	2.0	933	2.0	0.726	13.8	LOS B	4.9	125.0	0.35	0.47	0.69	25.2
All Vehicles			3384	2.4	3384	2.4	0.726	8.3	LOS A	4.9	125.0	0.29	0.23	0.39	28.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 4:43:00 PM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01 ROUNDABOUT_r1.sipx

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 4:42:44 PM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01
ROUNDAABOUT_r1.sipx

MOVEMENT SUMMARY



Site: [14] 14-Lexington (CITY ROUNDABOUT)

Output produced by SIDRA INTERSECTION Version: 10.0.8.241

New Site

Site Category: (None)

Roundabout

Site Scenario: 4 | SAT 2037 BUILD - 14 CITY

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand		Arrival		Deg. Satn	Aver. Delay	Level of Service	95% Back Of		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			Flows		Flows					Queue					
			[Total HV] veh/h	%	[Total HV] veh/h	%				[Veh. veh	Dist] ft				
South: N. Main St															
3	L2	All MCs	36	1.0	36	1.0	0.226	4.9	LOS A	1.1	26.6	0.32	0.16	0.32	28.2
8	T1	All MCs	683	1.0	683	1.0	0.226	1.8	LOS A	1.1	26.6	0.11	0.06	0.11	31.8
Approach			719	1.0	719	1.0	0.226	1.9	LOS A	1.1	26.6	0.12	0.06	0.12	31.6
North: Parade Rd (NH106)															
4	T1	All MCs	699	1.0	699	1.0	0.290	6.4	LOS A	1.5	38.5	0.15	0.04	0.15	30.5
14	R2	All MCs	89	1.0	89	1.0	0.290	4.9	LOS A	1.5	38.5	0.15	0.04	0.15	28.5
Approach			788	1.0	788	1.0	0.290	6.2	LOS A	1.5	38.5	0.15	0.04	0.15	30.3
West: Lexington Dr															
5	L2	All MCs	154	1.0	154	1.0	0.203	6.9	LOS A	0.8	19.0	0.57	0.51	0.57	26.3
12	R2	All MCs	162	1.0	162	1.0	0.098	2.9	LOS A	0.0	0.0	0.00	0.00	0.00	28.9
Approach			317	1.0	317	1.0	0.203	4.9	LOS A	0.8	19.0	0.28	0.25	0.28	27.5
All Vehicles			1823	1.0	1823	1.0	0.290	4.3	LOS A	1.5	38.5	0.16	0.09	0.16	30.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c >1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SIDRA INTERSECTION 10.0 | Copyright © 2000-2025 Akcelik and Associates Pty Ltd | sidrasolutions.com

Organisation: TFMORAN INC | Licence: PLUS / 1PC | Processed: Thursday, December 18, 2025 4:42:44 PM

Project: F:\TFM Projects\96126 Legacy at Laconia - Laconia, NH\96126-01 Pillsbury - NH State School Due Diligence\Traffic\SIDRA\96126-01 ROUNDABOUT_r1.sipx

ATTACHMENT G (Updated Rev1)

Intersection #15: Synchro (AM/PM/SAT)

2037 No-Build

2037 Build

2037 Build Mit

2037 Build Mit Non-Constrained

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	118	5	141	95	181	5	661	74	188	733	7
Future Volume (vph)	26	118	5	141	95	181	5	661	74	188	733	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	0	464	0	6	816	0	207	813	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	28.0	28.0		28.0	28.0		18.0	41.0		18.0	41.0	
Total Split (%)	24.6%	24.6%		24.6%	24.6%		15.8%	36.0%		15.8%	36.0%	
Maximum Green (s)	22.0	22.0		22.0	22.0		12.0	35.0		12.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.40			1.29		0.02	1.11		0.67	0.76	
Control Delay		33.1			177.6		11.8	94.2		31.1	24.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		33.1			177.6		11.8	94.2		31.1	24.0	

Corrected:
15mph Left
9mph Right

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 NB
Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	24%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	17.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		72			~304		1	~491		59	261	
Queue Length 95th (ft)		179			#679		10	#1049		#222	#957	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		412			361		372	737		335	1066	
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		0.40			1.29		0.02	1.11		0.62	0.76	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 91

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 15: N.Main St (NH106) & Oak St

 Ø1	 Ø2	 Ø9	 Ø4
18 s	41 s	27 s	28 s
 Ø5	 Ø6		 Ø8
18 s	41 s		28 s

Lane Group	Ø9
------------	----

Queue Length 50th (ft)	
------------------------	--

Queue Length 95th (ft)	
------------------------	--

Internal Link Dist (ft)	
-------------------------	--

Turn Bay Length (ft)	
----------------------	--

Base Capacity (vph)	
---------------------	--

Starvation Cap Reductn	
------------------------	--

Spillback Cap Reductn	
-----------------------	--

Storage Cap Reductn	
---------------------	--

Reduced v/c Ratio	
-------------------	--

Intersection Summary	
----------------------	--

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106) & Oak St

AM 2037 NB

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	118	5	141	95	181	5	661	74	188	733	7
Future Volume (vph)	26	118	5	141	95	181	5	661	74	188	733	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1838			1660		1719	1782		1711	1860	
Flt Permitted		0.83			0.75		0.14	1.00		0.09	1.00	
Satd. Flow (perm)		1538			1264		254	1782		155	1860	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	29	131	6	157	106	201	6	734	82	207	805	8
RTOR Reduction (vph)	0	2	0	0	23	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	164	0	0	441	0	6	813	0	207	813	0
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.3			22.3		41.7	40.6		57.2	50.1	
Effective Green, g (s)		24.3			24.3		45.7	42.6		59.2	52.1	
Actuated g/C Ratio		0.24			0.24		0.46	0.43		0.59	0.52	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		373			307		161	759		287	969	
v/s Ratio Prot							0.00	c0.46		c0.09	c0.44	
v/s Ratio Perm		0.11			c0.35		0.02			0.34		
v/c Ratio		0.44			1.43		0.04	1.07		0.72	0.84	
Uniform Delay, d1		32.1			37.9		18.2	28.7		25.2	20.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.8			213.5		0.1	53.5		8.6	6.5	
Delay (s)		32.9			251.3		18.3	82.2		33.8	26.9	
Level of Service		C			F		B	F		C	C	
Approach Delay (s)		32.9			251.3			81.7			28.3	
Approach LOS		C			F			F			C	
Intersection Summary												
HCM 2000 Control Delay			88.2			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			94.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	58	0	93	70	160	11	666	60	213	1034	25
Future Volume (vph)	51	58	0	93	70	160	11	666	60	213	1034	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)				0								
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	121	0	0	359	0	12	807	0	237	1177	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	21.0	21.0		21.0	21.0		21.0	51.0		21.0	51.0	
Total Split (%)	17.5%	17.5%		17.5%	17.5%		17.5%	42.5%		17.5%	42.5%	
Maximum Green (s)	15.0	15.0		15.0	15.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.72			1.23		0.05	0.88		0.69	0.96	
Control Delay		65.0			163.6		8.7	36.4		29.9	34.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	

Corrected:
15mph Left
9mph Right

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 NB
Timing Plan: NHDOT/City

Lane Group Ø9

Lane Configurations
Traffic Volume (vph)
Future Volume (vph)
Ideal Flow (vphpl)
Lane Width (ft)
Storage Length (ft)
Storage Lanes
Taper Length (ft)
Right Turn on Red
Link Speed (mph)
Link Distance (ft)
Travel Time (s)
Peak Hour Factor
Heavy Vehicles (%)
Parking (#/hr)
Shared Lane Traffic (%)
Lane Group Flow (vph)
Enter Blocked Intersection
Lane Alignment
Median Width(ft)
Link Offset(ft)
Crosswalk Width(ft)
Two way Left Turn Lane
Headway Factor
Turning Speed (mph)
Turn Type
Protected Phases 9
Permitted Phases
Detector Phase
Switch Phase
Minimum Initial (s) 4.0
Minimum Split (s) 27.0
Total Split (s) 27.0
Total Split (%) 23%
Maximum Green (s) 22.0
Yellow Time (s) 3.0
All-Red Time (s) 2.0
Lost Time Adjust (s)
Total Lost Time (s)
Lead/Lag
Lead-Lag Optimize?
Vehicle Extension (s) 3.0
Recall Mode None
Walk Time (s) 5.0
Flash Dont Walk (s) 17.0
Pedestrian Calls (#/hr) 5
v/c Ratio
Control Delay
Queue Delay

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		65.0			163.6		8.7	36.4		29.9	34.9	
Queue Length 50th (ft)		66			~239		2	385		67	433	
Queue Length 95th (ft)		#212			#560		13	#964		#239	#1489	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		167			291		387	915		386	1229	
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		0.72			1.23		0.03	0.88		0.61	0.96	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 96

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 15: N.Main St (NH106) & Oak St

 Ø1	 Ø2	 Ø9	 Ø4
21 s	51 s	27 s	21 s
 Ø5	 Ø6		 Ø8
21 s	51 s		21 s

Lane Group	Ø9
------------	----

Total Delay

Queue Length 50th (ft)

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106) & Oak St

PM 2037 NB

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	58	0	93	70	160	11	666	60	213	1034	25
Future Volume (vph)	51	58	0	93	70	160	11	666	60	213	1034	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.93		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1820			1730		1770	1840		1694	1838	
Flt Permitted		0.50			0.84		0.08	1.00		0.09	1.00	
Satd. Flow (perm)		936			1469		141	1840		162	1838	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	64	0	103	78	178	12	740	67	237	1149	28
RTOR Reduction (vph)	0	0	0	0	28	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	121	0	0	331	0	12	805	0	237	1177	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Parking (#/hr)				0								
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.2			15.2		51.9	50.8		69.4	62.3	
Effective Green, g (s)		17.2			17.2		55.9	52.8		71.4	64.3	
Actuated g/C Ratio		0.16			0.16		0.53	0.50		0.68	0.61	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		153			240		123	924		322	1124	
v/s Ratio Prot							0.00	0.44		c0.10	c0.64	
v/s Ratio Perm		0.13			c0.22		0.05			0.40		
v/c Ratio		0.79			1.38		0.10	0.87		0.74	1.05	
Uniform Delay, d1		42.2			43.9		23.0	23.1		25.9	20.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		23.7			193.8		0.3	9.0		8.5	39.9	
Delay (s)		65.9			237.7		23.3	32.2		34.4	60.3	
Level of Service		E			F		C	C		C	E	
Approach Delay (s)		65.9			237.7			32.0			56.0	
Approach LOS		E			F			C			E	
Intersection Summary												
HCM 2000 Control Delay			73.3			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			1.07									
Actuated Cycle Length (s)			105.1			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			92.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	30	2	35	40	105	11	427	33	90	613	9
Future Volume (vph)	19	30	2	35	40	105	11	427	33	90	613	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	56	0	0	200	0	12	511	0	100	691	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	24.0	24.0		24.0	24.0		13.0	24.0		13.0	24.0	
Total Split (s)	28.0	28.0		28.0	28.0		18.0	41.0		18.0	41.0	
Total Split (%)	24.6%	24.6%		24.6%	24.6%		15.8%	36.0%		15.8%	36.0%	
Maximum Green (s)	22.0	22.0		22.0	22.0		12.0	35.0		12.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.19			0.55		0.05	0.60		0.36	0.60	
Control Delay		29.7			27.3		38.8	23.9		37.2	17.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		29.7			27.3		38.8	23.9		37.2	17.4	

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 NB
Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	24%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	17.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		18			51		4	157		36	125	
Queue Length 95th (ft)		71			171		28	#531		125	#770	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		508			576		353	1009		345	1148	
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		0.03	0.51		0.29	0.60	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 74.6

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 15: N.Main St (NH106) & Oak St

 Ø1	 Ø2	 Ø9	 Ø4
18 s	41 s	27 s	28 s
 Ø5	 Ø6		 Ø8
18 s	41 s		28 s

Lane Group	Ø9
------------	----

Queue Length 50th (ft)	
------------------------	--

Queue Length 95th (ft)	
------------------------	--

Internal Link Dist (ft)	
-------------------------	--

Turn Bay Length (ft)	
----------------------	--

Base Capacity (vph)	
---------------------	--

Starvation Cap Reductn	
------------------------	--

Spillback Cap Reductn	
-----------------------	--

Storage Cap Reductn	
---------------------	--

Reduced v/c Ratio	
-------------------	--

Intersection Summary	
----------------------	--

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106) & Oak St

SAT 2037 NB

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	30	2	35	40	105	11	427	33	90	613	9
Future Volume (vph)	19	30	2	35	40	105	11	427	33	90	613	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.92		1.00	0.99		1.00	1.00	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1820			1683		1770	1843		1728	1877	
Flt Permitted		0.80			0.93		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1484			1576		1770	1843		1728	1877	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	21	33	2	39	44	117	12	474	37	100	681	10
RTOR Reduction (vph)	0	1	0	0	46	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	55	0	0	154	0	12	509	0	100	691	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		13.0			13.0		1.0	36.3		8.2	43.5	
Effective Green, g (s)		15.0			15.0		3.0	38.3		10.2	45.5	
Actuated g/C Ratio		0.18			0.18		0.04	0.46		0.12	0.55	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		266			283		63	846		211	1024	
v/s Ratio Prot							0.01	0.28		c0.06	c0.37	
v/s Ratio Perm		0.04			c0.10							
v/c Ratio		0.21			0.54		0.19	0.60		0.47	0.67	
Uniform Delay, d1		29.1			31.1		39.0	16.8		34.1	13.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			2.1		1.5	1.2		1.7	1.8	
Delay (s)		29.5			33.2		40.5	18.1		35.8	15.4	
Level of Service		C			C		D	B		D	B	
Approach Delay (s)		29.5			33.2			18.6			18.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			83.4			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			60.3%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Future Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	196	0	0	489	0	6	982	0	218	1164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	28.0	28.0		28.0	28.0		18.0	41.0		18.0	41.0	
Total Split (%)	24.6%	24.6%		24.6%	24.6%		15.8%	36.0%		15.8%	36.0%	
Maximum Green (s)	22.0	22.0		22.0	22.0		12.0	35.0		12.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.59			1.35		0.02	1.34		0.69	1.09	
Control Delay		40.2			205.3		11.8	186.6		32.8	77.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		40.2			205.3		11.8	186.6		32.8	77.3	

Corrected:
15mph Left
9mph Right

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 B
Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	24%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	17.0
Pedestrian Calls (#/hr)	1
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		92			~337		1	~697		66	564	
Queue Length 95th (ft)		#248			#718		10	#1318		#242	#1528	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		331			361		336	735		334	1067	
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		0.59			1.35		0.02	1.34		0.65	1.09	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 91.3

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 15: N.Main St (NH106) & Oak St

 Ø1	 Ø2	 Ø9	 Ø4
18 s	41 s	27 s	28 s
 Ø5	 Ø6		 Ø8
18 s	41 s		28 s

Lane Group	Ø9
------------	----

Queue Length 50th (ft)	
------------------------	--

Queue Length 95th (ft)	
------------------------	--

Internal Link Dist (ft)	
-------------------------	--

Turn Bay Length (ft)	
----------------------	--

Base Capacity (vph)	
---------------------	--

Starvation Cap Reductn	
------------------------	--

Spillback Cap Reductn	
-----------------------	--

Storage Cap Reductn	
---------------------	--

Reduced v/c Ratio	
-------------------	--

Intersection Summary	
----------------------	--

HCM Signalized Intersection Capacity Analysis

AM 2037 B

15: N.Main St (NH106) & Oak St

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Future Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.94		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1828			1654		1719	1787		1711	1858	
Flt Permitted		0.67			0.75		0.09	1.00		0.09	1.00	
Satd. Flow (perm)		1241			1263		170	1787		155	1858	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	59	131	6	157	106	226	6	900	82	218	1144	20
RTOR Reduction (vph)	0	1	0	0	26	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	195	0	0	463	0	6	980	0	218	1164	0
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.3			22.3		41.7	40.6		57.6	50.5	
Effective Green, g (s)		24.3			24.3		45.7	42.6		59.6	52.5	
Actuated g/C Ratio		0.24			0.24		0.46	0.42		0.59	0.52	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		300			305		125	758		293	971	
v/s Ratio Prot							0.00	c0.55		c0.10	c0.63	
v/s Ratio Perm		0.16			c0.37		0.02			0.35		
v/c Ratio		0.65			1.52		0.05	1.29		0.74	1.20	
Uniform Delay, d1		34.2			38.1		22.4	28.9		26.1	24.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		5.0			249.6		0.2	141.4		9.8	99.3	
Delay (s)		39.2			287.7		22.6	170.3		35.9	123.2	
Level of Service		D			F		C	F		D	F	
Approach Delay (s)		39.2			287.7			169.4			109.5	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		152.9										
HCM 2000 Volume to Capacity ratio		1.25										
Actuated Cycle Length (s)		100.4										
Intersection Capacity Utilization		105.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Future Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	142	0	0	375	0	12	1175	0	261	1536	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	21.0	21.0		21.0	21.0		21.0	51.0		21.0	51.0	
Total Split (%)	17.5%	17.5%		17.5%	17.5%		17.5%	42.5%		17.5%	42.5%	
Maximum Green (s)	15.0	15.0		15.0	15.0		15.0	45.0		15.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.01			1.28		0.05	1.30		0.76	1.24	
Control Delay		120.5			183.3		8.7	167.5		39.4	136.4	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		120.5			183.3		8.7	167.5		39.4	136.4	

Corrected:
15mph Left
9mph Right

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 B
Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	23%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	17.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		84			~261		2	~881		97	~1075	
Queue Length 95th (ft)		#270			#582		13	#1585		#310	#2084	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		141			292		382	905		365	1234	
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		1.01			1.28		0.03	1.30		0.72	1.24	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 97.1

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 15: N.Main St (NH106) & Oak St

 Ø1	 Ø2	 Ø9	 Ø4
21 s	51 s	27 s	21 s
 Ø5	 Ø6		 Ø8
21 s	51 s		21 s

Lane Group	Ø9
------------	----

Queue Length 50th (ft)	
------------------------	--

Queue Length 95th (ft)	
------------------------	--

Internal Link Dist (ft)	
-------------------------	--

Turn Bay Length (ft)	
----------------------	--

Base Capacity (vph)	
---------------------	--

Starvation Cap Reductn	
------------------------	--

Spillback Cap Reductn	
-----------------------	--

Storage Cap Reductn	
---------------------	--

Reduced v/c Ratio	
-------------------	--

Intersection Summary	
----------------------	--

HCM Signalized Intersection Capacity Analysis

PM 2037 B

15: N.Main St (NH106) & Oak St

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Future Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1813			1726		1770	1847		1694	1834	
Flt Permitted		0.43			0.84		0.08	1.00		0.07	1.00	
Satd. Flow (perm)		801			1478		142	1847		126	1834	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	64	0	103	78	194	12	1108	67	261	1477	59
RTOR Reduction (vph)	0	0	0	0	31	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	142	0	0	344	0	12	1173	0	261	1535	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.2			15.2		51.7	50.6		70.4	63.3	
Effective Green, g (s)		17.2			17.2		55.7	52.6		72.4	65.3	
Actuated g/C Ratio		0.16			0.16		0.52	0.50		0.68	0.61	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		129			239		121	914		319	1127	
v/s Ratio Prot							0.00	0.64		c0.12	c0.84	
v/s Ratio Perm		0.18			c0.23		0.05			0.44		
v/c Ratio		1.10			1.44		0.10	1.28		0.82	1.36	
Uniform Delay, d1		44.5			44.5		23.3	26.8		32.7	20.5	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		108.8			219.9		0.4	136.1		14.9	168.8	
Delay (s)		153.3			264.4		23.6	162.9		47.6	189.3	
Level of Service		F			F		C	F		D	F	
Approach Delay (s)		153.3			264.4			161.5			168.7	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		175.9										
HCM 2000 Volume to Capacity ratio		1.32										
Actuated Cycle Length (s)		106.2										
Intersection Capacity Utilization		109.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Future Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	0	243	0	12	695	0	134	900	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	13.0	13.0		13.0	13.0		13.0	13.0		13.0	13.0	
Total Split (s)	28.0	28.0		28.0	28.0		18.0	41.0		18.0	41.0	
Total Split (%)	24.6%	24.6%		24.6%	24.6%		15.8%	36.0%		15.8%	36.0%	
Maximum Green (s)	22.0	22.0		22.0	22.0		12.0	35.0		12.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.44			0.65		0.04	0.80		0.36	0.76	
Control Delay		38.8			30.2		10.5	29.9		11.4	21.2	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		38.8			30.2		10.5	29.9		11.4	21.2	

Corrected:
15mph Left
9mph Right

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 B
Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	4.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	24%
Maximum Green (s)	22.0
Yellow Time (s)	3.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	17.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		33			68		1	241		18	212	
Queue Length 95th (ft)		103			199		15	#837		91	#1100	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		291			539		422	873		442	1179	
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		0.29			0.45		0.03	0.80		0.30	0.76	

Intersection Summary

Area Type: Other

Cycle Length: 114

Actuated Cycle Length: 81.1

Natural Cycle: 120

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 15: N.Main St (NH106) & Oak St

 Ø1	 Ø2	 Ø9	 Ø4
18 s	41 s	27 s	28 s
 Ø5	 Ø6		 Ø8
18 s	41 s		28 s

Lane Group	Ø9
------------	----

Queue Length 50th (ft)	
------------------------	--

Queue Length 95th (ft)	
------------------------	--

Internal Link Dist (ft)	
-------------------------	--

Turn Bay Length (ft)	
----------------------	--

Base Capacity (vph)	
---------------------	--

Starvation Cap Reductn	
------------------------	--

Spillback Cap Reductn	
-----------------------	--

Storage Cap Reductn	
---------------------	--

Reduced v/c Ratio	
-------------------	--

Intersection Summary	
----------------------	--

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106) & Oak St

SAT 2037 B

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Future Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1805			1667		1770	1848		1728	1871	
Flt Permitted		0.51			0.94		0.12	1.00		0.15	1.00	
Satd. Flow (perm)		949			1586		228	1848		281	1871	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	48	33	2	39	44	160	12	658	37	134	866	34
RTOR Reduction (vph)	0	1	0	0	63	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	82	0	0	180	0	12	693	0	134	899	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.9			13.9		42.6	41.6		56.1	49.1	
Effective Green, g (s)		15.9			15.9		46.6	43.6		58.1	51.1	
Actuated g/C Ratio		0.18			0.18		0.52	0.48		0.64	0.57	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		167			279		169	894		349	1061	
v/s Ratio Prot							0.00	0.38		c0.04	c0.48	
v/s Ratio Perm		0.09			c0.11		0.03			0.20		
v/c Ratio		0.49			0.64		0.07	0.78		0.38	0.85	
Uniform Delay, d1		33.5			34.5		14.9	19.2		12.0	16.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			5.0		0.2	4.3		0.7	6.4	
Delay (s)		35.7			39.5		15.0	23.5		12.7	22.7	
Level of Service		D			D		B	C		B	C	
Approach Delay (s)		35.7			39.5			23.3			21.4	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			24.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			90.1			Sum of lost time (s)			17.0			
Intersection Capacity Utilization			71.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106)/N.Main St & Oak St

AM 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Future Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	196	0	0	489	0	6	982	0	218	1164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0		23.0	23.0		13.0	28.0		13.0	28.0	
Total Split (s)	34.0	34.0		34.0	34.0		13.0	57.0		15.0	59.0	
Total Split (%)	28.3%	28.3%		28.3%	28.3%		10.8%	47.5%		12.5%	49.2%	
Maximum Green (s)	28.0	28.0		28.0	28.0		7.0	51.0		9.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			10.0			10.0	
Pedestrian Calls (#/hr)	1	1		2	2			0			2	
v/c Ratio		0.56			1.31		0.03	1.12		0.91	1.04	
Control Delay		41.9			190.0		11.2	98.3		78.9	59.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		41.9			190.0		11.2	98.3		78.9	59.7	

Corrected:
15mph Left
9mph Right

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	2	3
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

Lanes, Volumes, Timings
15: N.Main St (NH106)/N.Main St & Oak St

AM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		112			~408		1	~758		97	694	
Queue Length 95th (ft)		219			#710		8	#1203		#291	#1460	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		349			373		208	874		239	1123	
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		0.56			1.31		0.03	1.12		0.91	1.04	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 108.8

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

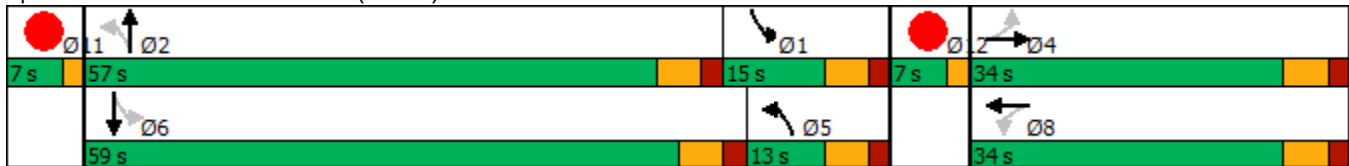
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 15: N.Main St (NH106)/N.Main St & Oak St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 50th (ft)		
------------------------	--	--

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106)/N.Main St & Oak St

AM 2037 B-MIT

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Future Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.94		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1828			1654		1719	1787		1711	1858	
Flt Permitted		0.68			0.75		0.08	1.00		0.07	1.00	
Satd. Flow (perm)		1259			1261		136	1787		126	1858	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	59	131	6	157	106	226	6	900	82	218	1144	20
RTOR Reduction (vph)	0	1	0	0	25	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	195	0	0	464	0	6	979	0	218	1164	0
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.1			28.1		52.4	51.1		71.1	63.8	
Effective Green, g (s)		30.1			30.1		56.4	53.1		73.1	65.8	
Actuated g/C Ratio		0.26			0.26		0.48	0.45		0.62	0.56	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		323			324		110	811		295	1044	
v/s Ratio Prot							0.00	c0.55		c0.10	c0.63	
v/s Ratio Perm		0.16			c0.37		0.02			0.36		
v/c Ratio		0.60			1.43		0.05	1.21		0.74	1.11	
Uniform Delay, d1		38.2			43.5		51.6	31.9		44.8	25.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.2			211.0		0.2	104.9		9.3	64.9	
Delay (s)		41.4			254.5		51.8	136.8		54.1	90.5	
Level of Service		D			F		D	F		D	F	
Approach Delay (s)		41.4			254.5			136.3			84.7	
Approach LOS		D			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		125.8										
HCM 2000 Volume to Capacity ratio		1.23										
Actuated Cycle Length (s)		117.0										
Intersection Capacity Utilization		105.9%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106)/N.Main St & Oak St

PM 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Future Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	142	0	0	375	0	12	1175	0	261	1536	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		1.0	1.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0		21.0	21.0		13.0	28.0		13.0	28.0	
Total Split (s)	25.0	25.0		25.0	25.0		13.0	63.0		18.0	68.0	
Total Split (%)	20.8%	20.8%		20.8%	20.8%		10.8%	52.5%		15.0%	56.7%	
Maximum Green (s)	19.0	19.0		19.0	19.0		7.0	57.0		12.0	62.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			10.0			10.0	
Pedestrian Calls (#/hr)	0	0		2	2			0			3	
v/c Ratio		0.94			1.18		0.06	1.17		0.92	1.22	
Control Delay		103.7			145.2		8.5	112.6		75.2	125.1	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		103.7			145.2		8.5	112.6		75.2	125.1	

Corrected:
15mph Left
9mph Right

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

Lanes, Volumes, Timings
15: N.Main St (NH106)/N.Main St & Oak St

PM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		95			~280		2	~939		126	~1237	
Queue Length 95th (ft)		#250			#541		10	#1430		#337	#1969	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		151			317		215	1005		283	1262	
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		0.94			1.18		0.06	1.17		0.92	1.22	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 108.8

Natural Cycle: 150

Control Type: Semi Act-Uncoord

~ 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.

Splits and Phases: 15: N.Main St (NH106)/N.Main St & Oak St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 50th (ft)

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106)/N.Main St & Oak St

PM 2037 B-MIT

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Future Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1813			1726		1770	1847		1694	1834	
Flt Permitted		0.42			0.84		0.07	1.00		0.06	1.00	
Satd. Flow (perm)		785			1479		126	1847		113	1834	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	64	0	103	78	194	12	1108	67	261	1477	59
RTOR Reduction (vph)	0	0	0	0	32	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	142	0	0	343	0	12	1173	0	261	1535	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		19.0			19.0		58.4	57.1		80.1	72.8	
Effective Green, g (s)		21.0			21.0		62.4	59.1		82.1	74.8	
Actuated g/C Ratio		0.18			0.18		0.53	0.51		0.70	0.64	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		141			265		113	933		336	1173	
v/s Ratio Prot							0.00	0.64		c0.13	c0.84	
v/s Ratio Perm		0.18			c0.23		0.05			0.42		
v/c Ratio		1.01			1.29		0.11	1.26		0.78	1.31	
Uniform Delay, d1		48.0			48.0		51.7	28.9		43.2	21.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		77.7			157.6		0.4	124.5		10.7	145.1	
Delay (s)		125.6			205.5		52.1	153.4		54.0	166.1	
Level of Service		F			F		D	F		D	F	
Approach Delay (s)		125.6			205.5			152.4			149.8	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay		155.7										
HCM 2000 Volume to Capacity ratio		1.28										
Actuated Cycle Length (s)		116.9										
Intersection Capacity Utilization		109.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106)/N.Main St & Oak St

SAT 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Future Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			1190			5810	
Travel Time (s)		11.4			11.4			27.0			132.0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	0	243	0	12	695	0	134	900	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		11.0	21.0		11.0	21.0	
Total Split (s)	23.0	23.0		23.0	23.0		13.0	70.0		13.0	70.0	
Total Split (%)	19.2%	19.2%		19.2%	19.2%		10.8%	58.3%		10.8%	58.3%	
Maximum Green (s)	17.0	17.0		17.0	17.0		7.0	64.0		7.0	64.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			10.0			10.0	
Pedestrian Calls (#/hr)	2	2		0	0			3			0	
v/c Ratio		0.40			0.64		0.05	0.73		0.38	0.74	
Control Delay		40.6			33.3		6.5	21.0		15.7	17.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		40.6			33.3		6.5	21.0		15.7	17.0	

Corrected:
15mph Left
9mph Right

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		

Lanes, Volumes, Timings
15: N.Main St (NH106)/N.Main St & Oak St

SAT 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		34			75		2	247		21	249	
Queue Length 95th (ft)		113			#256		10	514		60	#806	
Internal Link Dist (ft)		420			420			1110			5730	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		251			444		298	1513		380	1531	
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		0.33			0.55		0.04	0.46		0.35	0.59	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 82

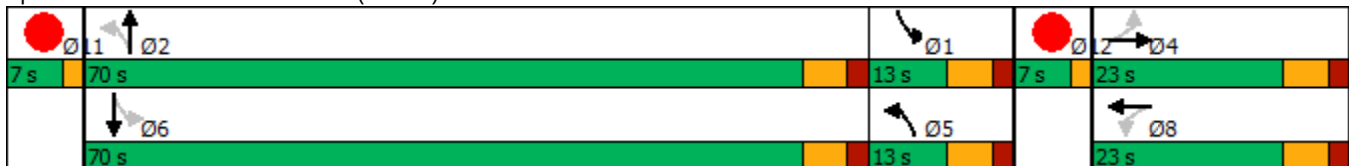
Natural Cycle: 90

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 15: N.Main St (NH106)/N.Main St & Oak St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 50th (ft)

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106)/N.Main St & Oak St

SAT 2037 B-MIT

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Future Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1805			1667		1770	1848		1728	1871	
Flt Permitted		0.55			0.94		0.10	1.00		0.17	1.00	
Satd. Flow (perm)		1013			1583		178	1848		314	1871	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	48	33	2	39	44	160	12	658	37	134	866	34
RTOR Reduction (vph)	0	1	0	0	56	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	82	0	0	187	0	12	693	0	134	899	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		14.8			14.8		40.7	39.9		57.6	50.8	
Effective Green, g (s)		16.8			16.8		44.7	41.9		59.6	52.8	
Actuated g/C Ratio		0.19			0.19		0.50	0.47		0.66	0.59	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		189			296		138	862		424	1100	
v/s Ratio Prot							0.00	0.37		c0.05	c0.48	
v/s Ratio Perm		0.08			c0.12		0.04			0.16		
v/c Ratio		0.43			0.63		0.09	0.80		0.32	0.82	
Uniform Delay, d1		32.3			33.6		34.5	20.4		21.6	14.7	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.6			4.3		0.3	5.5		0.4	4.8	
Delay (s)		33.9			38.0		34.7	25.9		22.1	19.5	
Level of Service		C			D		C	C		C	B	
Approach Delay (s)		33.9			38.0			26.1			19.8	
Approach LOS		C			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			24.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			89.8			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			70.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Future Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			570			514	
Travel Time (s)		11.4			11.4			13.0			11.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	196	0	0	489	0	6	982	0	218	1164	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		1.0	1.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0		21.0	21.0		13.0	28.0		13.0	28.0	
Total Split (s)	34.0	34.0		34.0	34.0		13.0	49.0		23.0	59.0	
Total Split (%)	28.3%	28.3%		28.3%	28.3%		10.8%	40.8%		19.2%	49.2%	
Maximum Green (s)	28.0	28.0		28.0	28.0		7.0	43.0		17.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			10.0			10.0	
Pedestrian Calls (#/hr)	0	0		2	2			0			3	
v/c Ratio		0.45			1.09		0.02	0.75		0.66	0.61	
Control Delay		33.2			101.4		12.8	29.7		39.3	17.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		33.2			101.4		12.8	29.7		39.3	17.6	
Queue Length 50th (ft)		88			~305		2	241		56	202	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		216			#701		8	428		161	456	
Internal Link Dist (ft)		420			420			490			434	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		433			448		245	1665		450	2156	
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		0.45			1.09		0.02	0.59		0.48	0.54	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 94.1

Natural Cycle: 100

Control Type: Semi Act-Uncoord

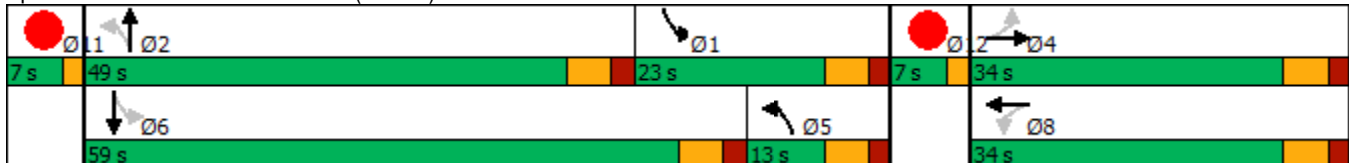
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 15: N.Main St (NH106) & Oak St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

AM 2037 B-MIT-Non Constrained_r1

15: N.Main St (NH106) & Oak St

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Future Volume (vph)	53	118	5	141	95	203	5	810	74	198	1041	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.94		1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1828			1654		1719	3395		1711	3530	
Flt Permitted		0.71			0.77		0.11	1.00		0.13	1.00	
Satd. Flow (perm)		1324			1302		201	3395		227	3530	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	59	131	6	157	106	226	6	900	82	218	1144	20
RTOR Reduction (vph)	0	1	0	0	24	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	195	0	0	465	0	6	976	0	218	1163	0
Heavy Vehicles (%)	2%	2%	2%	6%	6%	6%	5%	5%	5%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.7			28.7		35.1	34.0		56.0	48.9	
Effective Green, g (s)		30.7			30.7		39.1	36.0		58.0	50.9	
Actuated g/C Ratio		0.30			0.30		0.38	0.35		0.57	0.50	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		397			390		122	1194		389	1756	
v/s Ratio Prot							0.00	c0.29		c0.10	c0.33	
v/s Ratio Perm		0.15			c0.36		0.02			0.22		
v/c Ratio		0.49			1.19		0.05	0.82		0.56	0.66	
Uniform Delay, d1		29.4			35.8		36.3	30.2		29.0	19.3	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.0			109.4		0.2	4.5		1.8	1.0	
Delay (s)		30.4			145.2		36.5	34.6		30.8	20.2	
Level of Service		C			F		D	C		C	C	
Approach Delay (s)		30.4			145.2			34.6			21.9	
Approach LOS		C			F			C			C	
Intersection Summary												
HCM 2000 Control Delay		46.3										
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		102.3								16.0		
Intersection Capacity Utilization		79.9%								D		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Future Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			570			514	
Travel Time (s)		11.4			11.4			13.0			11.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	142	0	0	375	0	12	1175	0	261	1536	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		1.0	1.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0		21.0	21.0		13.0	28.0		13.0	28.0	
Total Split (s)	34.0	34.0		34.0	34.0		13.0	49.0		23.0	59.0	
Total Split (%)	28.3%	28.3%		28.3%	28.3%		10.8%	40.8%		19.2%	49.2%	
Maximum Green (s)	28.0	28.0		28.0	28.0		7.0	43.0		17.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			10.0			10.0	
Pedestrian Calls (#/hr)	0	0		2	2			0			3	
v/c Ratio		0.50			0.83		0.05	0.81		0.75	0.74	
Control Delay		41.0			49.2		12.2	33.0		48.7	19.9	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		41.0			49.2		12.2	33.0		48.7	19.9	
Queue Length 50th (ft)		80			213		3	353		112	320	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		168			#444		13	#554		#272	#764	
Internal Link Dist (ft)		420			420			490			434	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		298			475		230	1564		387	2122	
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		0.48			0.79		0.05	0.75		0.67	0.72	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 102.8

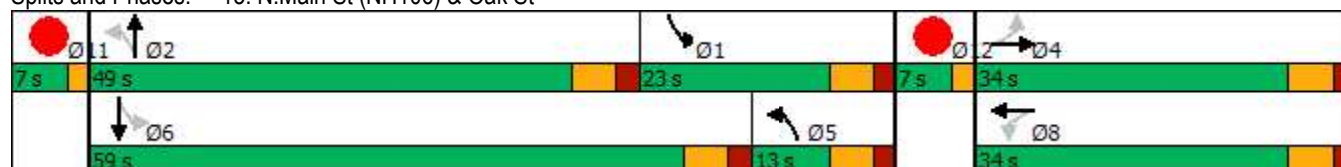
Natural Cycle: 100

Control Type: Semi Act-Uncoord

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 15: N.Main St (NH106) & Oak St



Lane Group	Ø11	Ø12
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

PM 2037 B-MIT-Non Constrained_r1

15: N.Main St (NH106) & Oak St

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Future Volume (vph)	70	58	0	93	70	175	11	997	60	235	1329	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.93		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1813			1726		1770	3509		1694	3485	
Flt Permitted		0.54			0.86		0.09	1.00		0.09	1.00	
Satd. Flow (perm)		1006			1500		176	3509		154	3485	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	64	0	103	78	194	12	1108	67	261	1477	59
RTOR Reduction (vph)	0	0	0	0	32	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	142	0	0	343	0	12	1171	0	261	1534	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.8			26.8		41.5	40.3		66.3	59.1	
Effective Green, g (s)		28.8			28.8		45.5	42.3		68.3	61.1	
Actuated g/C Ratio		0.26			0.26		0.41	0.38		0.62	0.55	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		261			389		118	1338		400	1920	
v/s Ratio Prot							0.00	c0.33		c0.13	c0.44	
v/s Ratio Perm		0.14			c0.23		0.04			0.27		
v/c Ratio		0.54			0.88		0.10	0.88		0.65	0.80	
Uniform Delay, d1		35.4			39.4		47.3	31.9		33.0	20.0	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.3			20.3		0.4	6.7		3.8	2.4	
Delay (s)		37.7			59.7		47.7	38.5		36.8	22.4	
Level of Service		D			E		D	D		D	C	
Approach Delay (s)		37.7			59.7			38.6			24.5	
Approach LOS		D			E			D			C	
Intersection Summary												
HCM 2000 Control Delay		33.6										
HCM 2000 Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		110.9										
Intersection Capacity Utilization		74.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Future Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	11	12	12
Storage Length (ft)	0		0	0		0	80		0	160		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			50			60		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		500			500			570			514	
Travel Time (s)		11.4			11.4			13.0			11.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	0	0	243	0	12	695	0	134	900	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.00	1.00
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		1.0	1.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	23.0	23.0		21.0	21.0		13.0	28.0		13.0	28.0	
Total Split (s)	34.0	34.0		34.0	34.0		13.0	49.0		23.0	59.0	
Total Split (%)	28.3%	28.3%		28.3%	28.3%		10.8%	40.8%		19.2%	49.2%	
Maximum Green (s)	28.0	28.0		28.0	28.0		7.0	43.0		17.0	53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?								Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	Min		None	Min	
Walk Time (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Flash Dont Walk (s)	15.0	15.0		15.0	15.0			10.0			10.0	
Pedestrian Calls (#/hr)	0	0		2	2			0			3	
v/c Ratio		0.28			0.55		0.03	0.56		0.27	0.45	
Control Delay		25.7			21.5		8.8	20.0		13.2	11.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		25.7			21.5		8.8	20.0		13.2	11.7	
Queue Length 50th (ft)		22			46		1	91		16	71	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
15: N.Main St (NH106) & Oak St

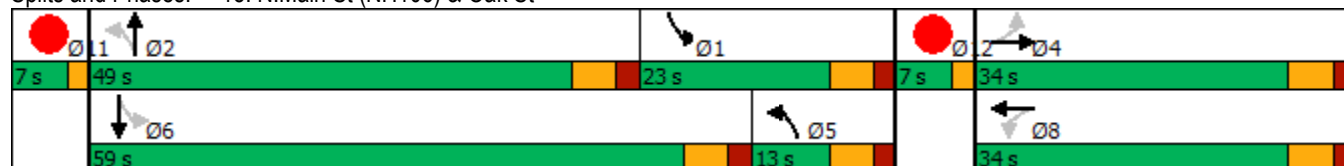
SAT 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		89			178		12	261		75	308	
Internal Link Dist (ft)		420			420			490			434	
Turn Bay Length (ft)							80			160		
Base Capacity (vph)		612			844		398	2699		761	3109	
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			0.29		0.03	0.26		0.18	0.29	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 64
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 15: N.Main St (NH106) & Oak St



Lane Group	Ø11	Ø12
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

15: N.Main St (NH106) & Oak St

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Future Volume (vph)	43	30	2	35	40	144	11	592	33	121	779	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	11	12	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	
Frt		1.00			0.91		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1805			1667		1770	3511		1728	3554	
Flt Permitted		0.64			0.94		0.19	1.00		0.26	1.00	
Satd. Flow (perm)		1193			1576		360	3511		476	3554	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	48	33	2	39	44	160	12	658	37	134	866	34
RTOR Reduction (vph)	0	1	0	0	60	0	0	3	0	0	2	0
Lane Group Flow (vph)	0	82	0	0	183	0	12	692	0	134	898	0
Heavy Vehicles (%)	2%	2%	2%	3%	3%	3%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		13.6			13.6		21.2	20.4		40.8	34.0	
Effective Green, g (s)		15.6			15.6		25.2	22.4		42.8	36.0	
Actuated g/C Ratio		0.22			0.22		0.35	0.31		0.60	0.50	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		259			343		181	1098		571	1786	
v/s Ratio Prot							0.00	c0.20		c0.05	c0.25	
v/s Ratio Perm		0.07			c0.12		0.02			0.09		
v/c Ratio		0.32			0.53		0.07	0.63		0.23	0.50	
Uniform Delay, d1		23.5			24.8		21.7	21.1		12.0	11.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.7			1.6		0.2	1.1		0.2	0.2	
Delay (s)		24.2			26.4		21.8	22.2		12.2	12.1	
Level of Service		C			C		C	C		B	B	
Approach Delay (s)		24.2			26.4			22.2			12.1	
Approach LOS		C			C			C			B	
Intersection Summary												
HCM 2000 Control Delay		17.7										
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		71.6										
Intersection Capacity Utilization		51.3%										
Analysis Period (min)		15										
c Critical Lane Group												

ATTACHMENT I (Updated Rev1)

Intersection #16: Synchro (AM/PM/SAT)

2037 No-Build

2037 Build

2037 Build Mit

2037 Build Mit Non-Constrained (#16 & #19)

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	65	0	0	301	188	104	548	26	153	0	533
Future Volume (vph)	2	65	0	0	301	188	104	548	26	153	0	533
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	72	0	0	334	209	116	609	29	170	0	592
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA	Corrected: 15mph Left 9mph Right		NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2			6	3	4	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0	11.0		11.0
Total Split (s)	25.0	25.0			25.0	25.0	25.0	25.0	25.0	25.0		25.0
Total Split (%)	24.5%	24.5%			24.5%	24.5%	24.5%	24.5%	24.5%	24.5%		24.5%
Maximum Green (s)	19.0	19.0			19.0	19.0	19.0	19.0	19.0	19.0		19.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lead	Lag	Lag	Lag	Lead		Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	3.0	4.0	4.0	4.0	3.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.01	0.14			0.65	0.22	0.22	1.12	0.05	0.49		0.67
Control Delay	26.5	24.6			33.0	2.7	25.1	102.7	0.2	33.3		7.2
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	26.5	24.6			33.0	2.7	25.1	102.7	0.2	33.3		7.2
Queue Length 50th (ft)	1	21			115	0	35	~288	0	63		0

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 NB
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	26%
Maximum Green (s)	25.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	11
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 NB
 Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	7	79			#371	40	117	#786	0	164		107
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100					500	50		50			105
Base Capacity (vph)	184	551			551	1073	519	546	547	524		883
Starvation Cap Reductn	0	0			0	0	0	0	0	0		0
Spillback Cap Reductn	0	0			0	0	0	0	0	0		0
Storage Cap Reductn	0	0			0	0	0	0	0	0		0
Reduced v/c Ratio	0.01	0.13			0.61	0.19	0.22	1.12	0.05	0.32		0.67

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 72.7

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St

 Ø2	 Ø3	 Ø4	 Ø9
25 s	25 s	25 s	27 s
 Ø6			
25 s			

Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	65	0	0	301	188	104	548	26	153	0	533
Future Volume (vph)	2	65	0	0	301	188	104	548	26	153	0	533
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)	1752	1845			1845	1568	1736	1827	1553	1752		1568
Flt Permitted	0.33	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)	616	1845			1845	1568	1736	1827	1553	1752		1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	72	0	0	334	209	116	609	29	170	0	592
RTOR Reduction (vph)	0	0	0	0	0	111	0	0	20	0	0	418
Lane Group Flow (vph)	2	72	0	0	334	98	116	609	9	170	0	174
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Actuated Green, G (s)	18.3	18.3			18.3	30.5	19.7	19.7	19.7	12.2		19.7
Effective Green, g (s)	20.3	20.3			20.3	34.5	21.7	21.7	21.7	14.2		21.7
Actuated g/C Ratio	0.28	0.28			0.28	0.47	0.29	0.29	0.29	0.19		0.29
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	4.0	4.0			4.0	3.0	4.0	4.0	4.0	3.0		4.0
Lane Grp Cap (vph)	169	507			507	817	510	537	456	337		461
v/s Ratio Prot		0.04			c0.18	0.02		c0.33		c0.10		
v/s Ratio Perm	0.00					0.04	0.07		0.01			0.11
v/c Ratio	0.01	0.14			0.66	0.12	0.23	1.13	0.02	0.50		0.38
Uniform Delay, d1	19.5	20.2			23.7	11.1	19.7	26.0	18.5	26.7		20.7
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.0	0.2			3.4	0.1	0.3	81.4	0.0	1.2		0.7
Delay (s)	19.5	20.4			27.1	11.1	20.0	107.4	18.5	27.8		21.4
Level of Service	B	C			C	B	C	F	B	C		C
Approach Delay (s)		20.3			21.0			90.5			22.8	
Approach LOS		C			C			F			C	
Intersection Summary												
HCM 2000 Control Delay			46.2		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			73.8		Sum of lost time (s)					14.0		
Intersection Capacity Utilization			64.6%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	81	0	0	429	227	229	452	65	197	0	694
Future Volume (vph)	5	81	0	0	429	227	229	452	65	197	0	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	90	0	0	477	252	254	502	72	216	0	763
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA	Corrected: 15mph Left 9mph Right		NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2			6	3	4	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	11.0	24.0	24.0	24.0	11.0		24.0
Total Split (s)	25.0	25.0			25.0	25.0	25.0	25.0	25.0	25.0		25.0
Total Split (%)	24.5%	24.5%			24.5%	24.5%	24.5%	24.5%	24.5%	24.5%		24.5%
Maximum Green (s)	19.0	19.0			19.0	19.0	19.0	19.0	19.0	19.0		19.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lead	Lag	Lag	Lag	Lead		Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.06	0.18			0.90	0.25	0.50	0.95	0.13	0.56		0.77
Control Delay	28.8	25.9			51.2	2.5	30.2	58.9	2.3	34.2		9.0
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	28.8	25.9			51.2	2.5	30.2	58.9	2.3	34.2		9.0
Queue Length 50th (ft)	2	29			195	0	90	208	0	82		0

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 NB
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	26%
Maximum Green (s)	25.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	14
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	15	94			#582	43	#243	#620	12	208		#146
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100					500	50		50			105
Base Capacity (vph)	95	514			530	1083	503	530	535	489		985
Starvation Cap Reductn	0	0			0	0	0	0	0	0		0
Spillback Cap Reductn	0	0			0	0	0	0	0	0		0
Storage Cap Reductn	0	0			0	0	0	0	0	0		0
Reduced v/c Ratio	0.06	0.18			0.90	0.23	0.50	0.95	0.13	0.44		0.77

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 76.3

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St

 Ø2	 Ø3	 Ø4	 Ø9
25 s	25 s	25 s	27 s
 Ø6			
25 s			

Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	81	0	0	429	227	229	452	65	197	0	694
Future Volume (vph)	5	81	0	0	429	227	229	452	65	197	0	694
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)	1736	1827			1881	1599	1787	1881	1599	1736		1553
Flt Permitted	0.19	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)	340	1827			1881	1599	1787	1881	1599	1736		1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	6	90	0	0	477	252	254	502	72	216	0	763
RTOR Reduction (vph)	0	0	0	0	0	127	0	0	52	0	0	552
Lane Group Flow (vph)	6	90	0	0	477	125	254	502	20	216	0	211
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Actuated Green, G (s)	19.5	19.5			19.5	34.4	19.5	19.5	19.5	14.9		19.5
Effective Green, g (s)	21.5	21.5			21.5	38.4	21.5	21.5	21.5	16.9		21.5
Actuated g/C Ratio	0.28	0.28			0.28	0.49	0.28	0.28	0.28	0.22		0.28
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Grp Cap (vph)	94	506			521	873	495	521	443	378		430
v/s Ratio Prot		0.05			c0.25	0.03		c0.27		c0.12		
v/s Ratio Perm	0.02					0.05	0.14		0.01			0.14
v/c Ratio	0.06	0.18			0.92	0.14	0.51	0.96	0.05	0.57		0.49
Uniform Delay, d1	20.6	21.3			27.2	10.7	23.6	27.7	20.5	27.1		23.5
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.4	0.2			21.1	0.1	1.2	30.3	0.1	2.5		1.2
Delay (s)	21.0	21.6			48.2	10.8	24.8	57.9	20.6	29.6		24.7
Level of Service	C	C			D	B	C	E	C	C		C
Approach Delay (s)		21.5			35.3			44.5			25.8	
Approach LOS		C			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			34.2		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			77.6		Sum of lost time (s)				14.0			
Intersection Capacity Utilization			88.2%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	53	0	0	390	107	237	320	91	93	0	381
Future Volume (vph)	0	53	0	0	390	107	237	320	91	93	0	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	433	119	263	356	101	103	0	423
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Prot
Protected Phases		2			6	3		4		3		3
Permitted Phases	2				6	6	4		4			
Detector Phase	2	2			6	3	4	4	4	3		3
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	11.0	11.0			11.0	11.0	11.0	11.0	11.0	11.0		11.0
Total Split (s)	25.0	25.0			25.0	25.0	25.0	25.0	25.0	25.0		25.0
Total Split (%)	24.5%	24.5%			24.5%	24.5%	24.5%	24.5%	24.5%	24.5%		24.5%
Maximum Green (s)	19.0	19.0			19.0	19.0	19.0	19.0	19.0	19.0		19.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lead	Lag	Lag	Lag	Lead		Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			None	Min	Min	Min	Min	Min		Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.11			0.77	0.13	0.51	0.66	0.19	0.31		0.66
Control Delay		24.2			37.5	3.1	29.2	33.0	5.7	30.0		8.8
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		24.2			37.5	3.1	29.2	33.0	5.7	30.0		8.8
Queue Length 50th (ft)		17			156	0	86	122	0	36		0

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 NB
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	26%
Maximum Green (s)	25.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		67			#515	31	#268	#401	33	105		85
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)						500	50		50			105
Base Capacity (vph)		556			561	1086	528	556	555	533		774
Starvation Cap Reductn		0			0	0	0	0	0	0		0
Spillback Cap Reductn		0			0	0	0	0	0	0		0
Storage Cap Reductn		0			0	0	0	0	0	0		0
Reduced v/c Ratio		0.11			0.77	0.11	0.50	0.64	0.18	0.19		0.55

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 72.7

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St

 Ø2	 Ø3	 Ø4	 Ø9
25 s	25 s	25 s	27 s
 Ø6			
25 s			

Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	53	0	0	390	107	237	320	91	93	0	381
Future Volume (vph)	0	53	0	0	390	107	237	320	91	93	0	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)		1863			1881	1599	1770	1863	1583	1787		1599
Flt Permitted		1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)		1863			1881	1599	1770	1863	1583	1787		1599
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	59	0	0	433	119	263	356	101	103	0	423
RTOR Reduction (vph)	0	0	0	0	0	62	0	0	72	0	0	345
Lane Group Flow (vph)	0	59	0	0	433	57	263	356	29	103	0	78
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Prot
Protected Phases		2			6	3		4		3		3
Permitted Phases	2				6	6	4		4			
Actuated Green, G (s)		19.7			19.7	31.3	19.0	19.0	19.0	11.6		11.6
Effective Green, g (s)		21.7			21.7	35.3	21.0	21.0	21.0	13.6		13.6
Actuated g/C Ratio		0.29			0.29	0.48	0.28	0.28	0.28	0.18		0.18
Clearance Time (s)		6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Grp Cap (vph)		547			552	850	502	529	449	328		294
v/s Ratio Prot		0.03			c0.23	0.01		c0.19		c0.06		0.05
v/s Ratio Perm						0.02	0.15		0.02			
v/c Ratio		0.11			0.78	0.07	0.52	0.67	0.06	0.31		0.26
Uniform Delay, d1		19.0			24.0	10.4	22.2	23.4	19.3	26.1		25.9
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		0.1			7.6	0.0	1.3	3.7	0.1	0.8		0.7
Delay (s)		19.2			31.6	10.5	23.5	27.1	19.4	26.9		26.5
Level of Service		B			C	B	C	C	B	C		C
Approach Delay (s)		19.2			27.0			24.7			26.6	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			25.7		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			73.9		Sum of lost time (s)					14.0		
Intersection Capacity Utilization			67.2%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Future Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	72	0	0	334	240	116	643	29	204	0	671
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA	Corrected: 15mph Left 9mph Right		NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2			6	3	4	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	11.0	24.0	24.0	24.0	11.0		24.0
Total Split (s)	25.0	25.0			25.0	25.0	25.0	25.0	25.0	25.0		25.0
Total Split (%)	24.5%	24.5%			24.5%	24.5%	24.5%	24.5%	24.5%	24.5%		24.5%
Maximum Green (s)	19.0	19.0			19.0	19.0	19.0	19.0	19.0	19.0		19.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lead	Lag	Lag	Lag	Lead		Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.01	0.14			0.66	0.25	0.23	1.22	0.05	0.53		0.72
Control Delay	27.0	25.3			34.5	2.6	26.0	141.5	0.2	33.5		7.9
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	27.0	25.3			34.5	2.6	26.0	141.5	0.2	33.5		7.9
Queue Length 50th (ft)	1	22			122	0	37	~340	0	77		0

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	26%
Maximum Green (s)	25.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	11
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	8	79			#371	42	117	#836	0	196		119
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100					500	50		50			105
Base Capacity (vph)	172	534			534	1061	502	529	533	507		930
Starvation Cap Reductn	0	0			0	0	0	0	0	0		0
Spillback Cap Reductn	0	0			0	0	0	0	0	0		0
Storage Cap Reductn	0	0			0	0	0	0	0	0		0
Reduced v/c Ratio	0.01	0.13			0.63	0.23	0.23	1.22	0.05	0.40		0.72

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 74.7

Natural Cycle: 100

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St

 Ø2	 Ø3	 Ø4	 Ø9
25 s	25 s	25 s	27 s
 Ø6			
25 s			

Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Future Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)	1752	1845			1845	1568	1736	1827	1553	1752		1568
Flt Permitted	0.32	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)	595	1845			1845	1568	1736	1827	1553	1752		1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	72	0	0	334	240	116	643	29	204	0	671
RTOR Reduction (vph)	0	0	0	0	0	124	0	0	21	0	0	480
Lane Group Flow (vph)	2	72	0	0	334	116	116	643	8	204	0	191
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Actuated Green, G (s)	18.4	18.4			18.4	32.6	19.6	19.6	19.6	14.2		19.6
Effective Green, g (s)	20.4	20.4			20.4	36.6	21.6	21.6	21.6	16.2		21.6
Actuated g/C Ratio	0.27	0.27			0.27	0.48	0.28	0.28	0.28	0.21		0.28
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Grp Cap (vph)	159	495			495	838	494	519	441	373		446
v/s Ratio Prot		0.04			c0.18	0.03		c0.35		c0.12		
v/s Ratio Perm	0.00					0.04	0.07		0.01			0.12
v/c Ratio	0.01	0.15			0.67	0.14	0.23	1.24	0.02	0.55		0.43
Uniform Delay, d1	20.4	21.1			24.8	10.9	20.8	27.2	19.5	26.6		22.1
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.0	0.2			4.0	0.1	0.3	123.2	0.0	2.1		0.9
Delay (s)	20.4	21.3			28.7	11.0	21.1	150.4	19.6	28.6		23.0
Level of Service	C	C			C	B	C	F	B	C		C
Approach Delay (s)		21.3			21.3			126.5			24.3	
Approach LOS		C			C			F			C	
Intersection Summary												
HCM 2000 Control Delay			58.3				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			75.9				Sum of lost time (s)			14.0		
Intersection Capacity Utilization			69.0%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Future Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	90	0	0	477	307	254	616	72	271	0	874
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2	Corrected: 15mph Left 9mph Right			6	3	4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2				6	3	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	11.0	24.0	24.0	24.0	11.0		24.0
Total Split (s)	25.0	25.0			25.0	25.0	25.0	25.0	25.0	25.0		25.0
Total Split (%)	24.5%	24.5%			24.5%	24.5%	24.5%	24.5%	24.5%	24.5%		24.5%
Maximum Green (s)	19.0	19.0			19.0	19.0	19.0	19.0	19.0	19.0		19.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lead	Lag	Lag	Lag	Lead		Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio	0.06	0.18			0.93	0.29	0.52	1.20	0.14	0.64		0.91
Control Delay	29.4	26.6			56.9	2.5	31.5	136.7	2.3	36.3		20.0
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	29.4	26.6			56.9	2.5	31.5	136.7	2.3	36.3		20.0
Queue Length 50th (ft)	2	32			213	0	99	~348	0	107		47

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B
 Timing Plan: NHDOT/City

Lane Group Ø9

Lane Configurations
 Traffic Volume (vph)
 Future Volume (vph)
 Ideal Flow (vphpl)
 Storage Length (ft)
 Storage Lanes
 Taper Length (ft)
 Right Turn on Red
 Link Speed (mph)
 Link Distance (ft)
 Travel Time (s)
 Peak Hour Factor
 Heavy Vehicles (%)
 Shared Lane Traffic (%)
 Lane Group Flow (vph)
 Enter Blocked Intersection
 Lane Alignment
 Median Width(ft)
 Link Offset(ft)
 Crosswalk Width(ft)
 Two way Left Turn Lane
 Headway Factor
 Turning Speed (mph)
 Turn Type
 Protected Phases 9
 Permitted Phases
 Detector Phase
 Switch Phase
 Minimum Initial (s) 1.0
 Minimum Split (s) 27.0
 Total Split (s) 27.0
 Total Split (%) 26%
 Maximum Green (s) 25.0
 Yellow Time (s) 2.0
 All-Red Time (s) 0.0
 Lost Time Adjust (s)
 Total Lost Time (s)
 Lead/Lag
 Lead-Lag Optimize?
 Vehicle Extension (s) 4.0
 Recall Mode None
 Walk Time (s) 7.0
 Flash Dont Walk (s) 18.0
 Pedestrian Calls (#/hr) 14
 v/c Ratio
 Control Delay
 Queue Delay
 Total Delay
 Queue Length 50th (ft)

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	15	94			#582	46	#243	#789	12	#286		#390
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100					500	50		50			105
Base Capacity (vph)	93	499			513	1080	488	513	522	474		965
Starvation Cap Reductn	0	0			0	0	0	0	0	0		0
Spillback Cap Reductn	0	0			0	0	0	0	0	0		0
Storage Cap Reductn	0	0			0	0	0	0	0	0		0
Reduced v/c Ratio	0.06	0.18			0.93	0.28	0.52	1.20	0.14	0.57		0.91

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 78.4

Natural Cycle: 140

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St

 Ø2	 Ø3	 Ø4	 Ø9
25 s	25 s	25 s	27 s
 Ø6			
25 s			

Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Future Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)	1736	1827			1881	1599	1787	1881	1599	1736		1553
Flt Permitted	0.19	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)	341	1827			1881	1599	1787	1881	1599	1736		1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	6	90	0	0	477	307	254	616	72	271	0	874
RTOR Reduction (vph)	0	0	0	0	0	151	0	0	53	0	0	545
Lane Group Flow (vph)	6	90	0	0	477	156	254	616	19	271	0	329
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Actuated Green, G (s)	19.4	19.4			19.4	36.5	19.4	19.4	19.4	17.1		19.4
Effective Green, g (s)	21.4	21.4			21.4	40.5	21.4	21.4	21.4	19.1		21.4
Actuated g/C Ratio	0.27	0.27			0.27	0.51	0.27	0.27	0.27	0.24		0.27
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Grp Cap (vph)	91	490			505	892	479	505	429	416		416
v/s Ratio Prot		0.05			c0.25	0.04		c0.33		c0.16		
v/s Ratio Perm	0.02					0.06	0.14		0.01			0.21
v/c Ratio	0.07	0.18			0.94	0.17	0.53	1.22	0.05	0.65		0.79
Uniform Delay, d1	21.7	22.4			28.6	10.6	24.9	29.2	21.6	27.3		27.1
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.4	0.2			26.8	0.1	1.4	115.8	0.1	4.0		10.4
Delay (s)	22.1	22.7			55.4	10.7	26.3	145.0	21.6	31.3		37.5
Level of Service	C	C			E	B	C	F	C	C		D
Approach Delay (s)		22.6			37.9			103.5			36.0	
Approach LOS		C			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			57.5									E
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			79.7							14.0		
Intersection Capacity Utilization			94.5%							F		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	53	0	0	390	146	237	394	91	128	0	449
Future Volume (vph)	0	53	0	0	390	146	237	394	91	128	0	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	433	162	263	438	101	142	0	499
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA	Corrected: 15mph Left 9mph Right		NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2			6	3	4	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	11.0	24.0	24.0	24.0	11.0		24.0
Total Split (s)	25.0	25.0			25.0	25.0	25.0	25.0	25.0	25.0		25.0
Total Split (%)	24.5%	24.5%			24.5%	24.5%	24.5%	24.5%	24.5%	24.5%		24.5%
Maximum Green (s)	19.0	19.0			19.0	19.0	19.0	19.0	19.0	19.0		19.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lead	Lag	Lag	Lag	Lead		Lag
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.11			0.79	0.17	0.51	0.80	0.18	0.41		0.61
Control Delay		24.3			38.7	2.8	29.1	39.9	5.6	31.7		6.6
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		24.3			38.7	2.8	29.1	39.9	5.6	31.7		6.6
Queue Length 50th (ft)		17			158	0	87	161	0	51		0

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	27.0
Total Split (s)	27.0
Total Split (%)	26%
Maximum Green (s)	25.0
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	4.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		67			#515	35	#268	#527	33	139		93
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)						500	50		50			105
Base Capacity (vph)		546			551	1085	518	546	547	523		821
Starvation Cap Reductn		0			0	0	0	0	0	0		0
Spillback Cap Reductn		0			0	0	0	0	0	0		0
Storage Cap Reductn		0			0	0	0	0	0	0		0
Reduced v/c Ratio		0.11			0.79	0.15	0.51	0.80	0.18	0.27		0.61

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 73.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St

 Ø2	 Ø3	 Ø4	 Ø9
25 s	25 s	25 s	27 s
 Ø6			
25 s			

Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	53	0	0	390	146	237	394	91	128	0	449
Future Volume (vph)	0	53	0	0	390	146	237	394	91	128	0	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt		1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)		1863			1881	1599	1770	1863	1583	1787		1599
Flt Permitted		1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)		1863			1881	1599	1770	1863	1583	1787		1599
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	59	0	0	433	162	263	438	101	142	0	499
RTOR Reduction (vph)	0	0	0	0	0	85	0	0	72	0	0	355
Lane Group Flow (vph)	0	59	0	0	433	77	263	438	29	142	0	144
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Actuated Green, G (s)		19.6			19.6	31.8	19.6	19.6	19.6	12.2		19.6
Effective Green, g (s)		21.6			21.6	35.8	21.6	21.6	21.6	14.2		21.6
Actuated g/C Ratio		0.29			0.29	0.48	0.29	0.29	0.29	0.19		0.29
Clearance Time (s)		6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)		4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Grp Cap (vph)		536			541	848	509	536	455	338		460
v/s Ratio Prot		0.03			c0.23	0.02		c0.24		c0.08		
v/s Ratio Perm						0.03	0.15		0.02			0.09
v/c Ratio		0.11			0.80	0.09	0.52	0.82	0.06	0.42		0.31
Uniform Delay, d1		19.6			24.7	10.7	22.3	24.9	19.4	26.8		20.9
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2		0.1			8.8	0.1	1.2	9.8	0.1	1.2		0.5
Delay (s)		19.8			33.5	10.8	23.5	34.7	19.4	27.9		21.4
Level of Service		B			C	B	C	C	B	C		C
Approach Delay (s)		19.8			27.3			29.1			22.9	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			26.4		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.67									
Actuated Cycle Length (s)			75.0		Sum of lost time (s)					14.0		
Intersection Capacity Utilization			71.5%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Future Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	72	0	0	334	240	116	643	29	204	0	671
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2	Corrected: 15mph Left 9mph Right		6	3		4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2			6	3	4	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	24.0	24.0	24.0	24.0	24.0		24.0
Total Split (s)	24.0	24.0			24.0	24.0	40.0	40.0	40.0	24.0		40.0
Total Split (%)	23.5%	23.5%			23.5%	23.5%	39.2%	39.2%	39.2%	23.5%		39.2%
Maximum Green (s)	18.0	18.0			18.0	18.0	34.0	34.0	34.0	18.0		34.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lag	Lead	Lead	Lead	Lag		Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0		3.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Flash Dont Walk (s)	13.0	13.0			13.0		17.0	17.0	17.0			17.0
Pedestrian Calls (#/hr)	4	4			3		4	4	4			4
v/c Ratio	0.02	0.17			0.80	0.28	0.16	0.84	0.04	0.62		0.64
Control Delay	31.5	30.8			48.7	2.8	18.8	36.9	0.1	42.0		5.1
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	31.5	30.8			48.7	2.8	18.8	36.9	0.1	42.0		5.1
Queue Length 50th (ft)	1	31			167	0	37	297	0	99		0

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B-MIT

Timing Plan: MIT

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	7	4
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	8	80			#383	38	94	#653	0	199		83
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100					500	50		50			105
Base Capacity (vph)	93	427			427	831	723	761	728	405		1044
Starvation Cap Reductn	0	0			0	0	0	0	0	0		0
Spillback Cap Reductn	0	0			0	0	0	0	0	0		0
Storage Cap Reductn	0	0			0	0	0	0	0	0		0
Reduced v/c Ratio	0.02	0.17			0.78	0.29	0.16	0.84	0.04	0.50		0.64

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 87.1

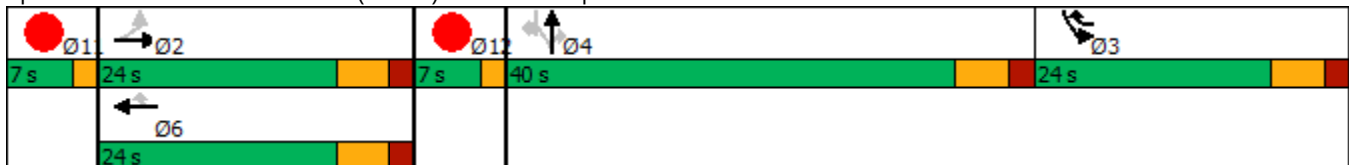
Natural Cycle: 100

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B-MIT
Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Future Volume (vph)	2	65	0	0	301	216	104	579	26	184	0	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)	1752	1845			1845	1568	1736	1827	1553	1752		1568
Flt Permitted	0.22	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)	406	1845			1845	1568	1736	1827	1553	1752		1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	72	0	0	334	240	116	643	29	204	0	671
RTOR Reduction (vph)	0	0	0	0	0	144	0	0	17	0	0	402
Lane Group Flow (vph)	2	72	0	0	334	96	116	643	12	204	0	269
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Actuated Green, G (s)	17.9	17.9			17.9	32.3	34.3	34.3	34.3	14.4		34.3
Effective Green, g (s)	19.9	19.9			19.9	36.3	36.3	36.3	36.3	16.4		36.3
Actuated g/C Ratio	0.22	0.22			0.22	0.40	0.40	0.40	0.40	0.18		0.40
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	89	406			406	629	697	733	623	317		629
v/s Ratio Prot		0.04			c0.18	0.03		c0.35		c0.12		
v/s Ratio Perm	0.00					0.03	0.07		0.01			0.17
v/c Ratio	0.02	0.18			0.82	0.15	0.17	0.88	0.02	0.64		0.43
Uniform Delay, d1	27.6	28.6			33.6	17.2	17.3	25.0	16.3	34.3		19.6
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.1	0.2			12.6	0.1	0.1	11.5	0.0	4.4		0.5
Delay (s)	27.7	28.8			46.2	17.4	17.5	36.5	16.3	38.7		20.0
Level of Service	C	C			D	B	B	D	B	D		C
Approach Delay (s)		28.8			34.1			32.9			24.4	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			29.9									
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			90.4									
Intersection Capacity Utilization			69.0%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Future Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	90	0	0	477	307	254	616	72	271	0	874
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2	Corrected: 15mph Left 9mph Right			6	3	4		3		
Permitted Phases	2					6	4		4			6
Detector Phase	2	2				6	3	4	4	3		6
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	24.0	24.0	24.0	24.0	24.0		24.0
Total Split (s)	28.0	28.0			28.0	25.0	35.0	35.0	35.0	25.0		28.0
Total Split (%)	27.5%	27.5%			27.5%	24.5%	34.3%	34.3%	34.3%	24.5%		27.5%
Maximum Green (s)	22.0	22.0			22.0	19.0	29.0	29.0	29.0	19.0		22.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lag	Lead	Lead	Lead	Lag		
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		Min
Walk Time (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Flash Dont Walk (s)	13.0	13.0			13.0		17.0	17.0	17.0			13.0
Pedestrian Calls (#/hr)	2	2			3		9	9	9			3
v/c Ratio	0.07	0.18			0.94	0.31	0.41	0.94	0.11	0.71		0.92
Control Delay	30.6	28.2			62.2	2.2	25.9	54.0	0.4	44.7		22.2
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	30.6	28.2			62.2	2.2	25.9	54.0	0.4	44.7		22.2
Queue Length 50th (ft)	3	38			258	0	105	324	0	136		64

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B-MIT

Timing Plan: MIT

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	4.0	4.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	15	91			#544	37	210	#663	0	#286		#404
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100					500	50		50			105
Base Capacity (vph)	81	492			507	979	622	655	647	409		952
Starvation Cap Reductn	0	0			0	0	0	0	0	0		0
Spillback Cap Reductn	0	0			0	0	0	0	0	0		0
Storage Cap Reductn	0	0			0	0	0	0	0	0		0
Reduced v/c Ratio	0.07	0.18			0.94	0.31	0.41	0.94	0.11	0.66		0.92

Intersection Summary

Area Type: Other

Cycle Length: 102

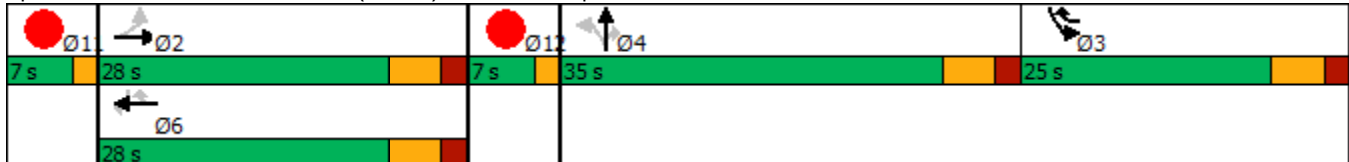
Actuated Cycle Length: 89.4

Natural Cycle: 110

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B-MIT
Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Future Volume (vph)	5	81	0	0	429	276	229	554	65	247	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Util. Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00	0.85	1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (prot)	1736	1827			1881	1599	1787	1881	1599	1736		1553
Flt Permitted	0.17	1.00			1.00	1.00	0.95	1.00	1.00	0.95		1.00
Satd. Flow (perm)	303	1827			1881	1599	1787	1881	1599	1736		1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	6	90	0	0	477	307	254	616	72	271	0	874
RTOR Reduction (vph)	0	0	0	0	0	162	0	0	48	0	0	541
Lane Group Flow (vph)	6	90	0	0	477	145	254	616	24	271	0	333
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			6
Actuated Green, G (s)	22.1	22.1			22.1	39.7	29.1	29.1	29.1	17.6		22.1
Effective Green, g (s)	24.1	24.1			24.1	43.7	31.1	31.1	31.1	19.6		24.1
Actuated g/C Ratio	0.26	0.26			0.26	0.47	0.34	0.34	0.34	0.21		0.26
Clearance Time (s)	6.0	6.0			6.0	6.0	6.0	6.0	6.0	6.0		6.0
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lane Grp Cap (vph)	78	475			489	754	600	631	537	367		404
v/s Ratio Prot		0.05			c0.25	0.04		c0.33		c0.16		
v/s Ratio Perm	0.02					0.05	0.14		0.02			0.21
v/c Ratio	0.08	0.19			0.98	0.19	0.42	0.98	0.05	0.74		0.82
Uniform Delay, d1	25.9	26.7			34.0	14.2	23.8	30.4	20.7	34.1		32.3
Progression Factor	1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	0.6	0.3			34.2	0.2	0.7	29.7	0.0	8.1		13.4
Delay (s)	26.4	26.9			68.2	14.4	24.5	60.1	20.8	42.2		45.7
Level of Service	C	C			E	B	C	E	C	D		D
Approach Delay (s)		26.9			47.1			47.5			44.8	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM 2000 Control Delay			45.7									
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			92.6									
Intersection Capacity Utilization			94.5%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	53	0	0	390	146	237	394	91	128	0	449
Future Volume (vph)	0	53	0	0	390	146	237	394	91	128	0	449
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		105
Storage Lanes	1		0	0		1	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	59	0	0	433	162	263	438	101	142	0	499
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60	60	60	60	60	60	60	60	60	60	60
Turn Type	Perm	NA			NA	pm+ov	Perm	NA	Perm	Prot		Perm
Protected Phases		2			6	3		4		3		
Permitted Phases	2					6	4		4			4
Detector Phase	2	2			6	3	4	4	4	3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0	5.0	5.0	5.0	5.0	5.0		5.0
Minimum Split (s)	24.0	24.0			24.0	19.0	24.0	24.0	24.0	19.0		24.0
Total Split (s)	26.0	26.0			26.0	24.0	26.0	26.0	26.0	24.0		26.0
Total Split (%)	28.9%	28.9%			28.9%	26.7%	28.9%	28.9%	28.9%	26.7%		28.9%
Maximum Green (s)	20.0	20.0			20.0	18.0	20.0	20.0	20.0	18.0		20.0
Yellow Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	2.0	2.0			2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Lead/Lag						Lag	Lead	Lead	Lead	Lag		Lead
Lead-Lag Optimize?						Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0	4.0		4.0
Recall Mode	Min	Min			Min	None	None	None	None	None		None
Walk Time (s)	0.0	0.0			0.0		0.0	0.0	0.0			0.0
Flash Dont Walk (s)	13.0	13.0			13.0		17.0	17.0	17.0			17.0
Pedestrian Calls (#/hr)	2	2			0		3	3	3			3
v/c Ratio		0.10			0.76	0.17	0.49	0.77	0.17	0.41		0.60
Control Delay		21.7			35.6	2.0	26.3	36.0	1.9	30.4		6.0
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay		21.7			35.6	2.0	26.3	36.0	1.9	30.4		6.0
Queue Length 50th (ft)		18			163	0	90	166	0	54		0

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	8%	8%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	4.0	4.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	2	3
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
 16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		58			#423	24	215	#433	12	123		81
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)						500	50		50			105
Base Capacity (vph)		570			575	941	541	570	594	497		835
Starvation Cap Reductn		0			0	0	0	0	0	0		0
Spillback Cap Reductn		0			0	0	0	0	0	0		0
Storage Cap Reductn		0			0	0	0	0	0	0		0
Reduced v/c Ratio		0.10			0.75	0.17	0.49	0.77	0.17	0.29		0.60

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 72.8

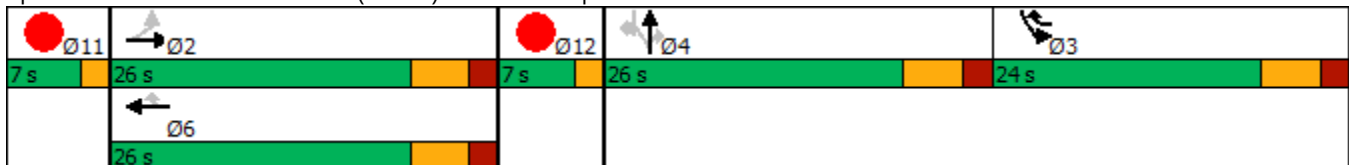
Natural Cycle: 85

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	165	72	0	0	301	216	104	579	26	184	0	604
Future Volume (vph)	165	72	0	0	301	216	104	579	26	184	0	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		150
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)	29%											
Lane Group Flow (vph)	130	133	0	0	574	0	116	672	0	204	0	671
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Split	NA			NA		Perm	NA		Prot		Perm
Protected Phases	2	2			6			4		3		
Permitted Phases							4					4
Detector Phase	2	2			6		4	4		3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	19.0	19.0			17.0		23.0	23.0		11.0		23.0
Total Split (s)	19.0	19.0			24.0		24.0	24.0		19.0		24.0
Total Split (%)	19.0%	19.0%			24.0%		24.0%	24.0%		19.0%		24.0%
Maximum Green (s)	13.0	13.0			18.0		18.0	18.0		13.0		18.0
Yellow Time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0		-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lead	Lead			Lag		Lead	Lead		Lag		Lead
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes		Yes		Yes
Vehicle Extension (s)	4.0	4.0			3.0		4.0	4.0		4.0		4.0
Recall Mode	Min	Min			Min		None	None		None		None
Walk Time (s)	0.0	0.0			0.0		0.0	0.0				0.0
Flash Dont Walk (s)	13.0	13.0			11.0		17.0	17.0				17.0
Pedestrian Calls (#/hr)	2	2			0		9	9				9
v/c Ratio	0.49	0.48			0.71		0.28	0.81		0.67		0.76
Control Delay	41.1	40.7			27.9		31.3	41.2		47.3		9.3
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0		0.0
Total Delay	41.1	40.7			27.9		31.3	41.2		47.3		9.3
Queue Length 50th (ft)	66	67			104		51	178		103		0
Queue Length 95th (ft)	145	147			191		116	#343		#240		120

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	4.0	4.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100						50					150
Base Capacity (vph)	298	307			909		414	827		313		885
Starvation Cap Reductn	0	0			0		0	0		0		0
Spillback Cap Reductn	0	0			0		0	0		0		0
Storage Cap Reductn	0	0			0		0	0		0		0
Reduced v/c Ratio	0.44	0.43			0.63		0.28	0.81		0.65		0.76

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 84.7

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St



Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					 			 				
Traffic Volume (vph)	165	72	0	0	301	216	104	579	26	184	0	604
Future Volume (vph)	165	72	0	0	301	216	104	579	26	184	0	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
Lane Util. Factor	0.95	0.95			0.95		1.00	0.95		1.00		1.00
Frt	1.00	1.00			0.94		1.00	0.99		1.00		0.85
Flt Protected	0.95	0.98			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1665	1718			3285		1736	3449		1752		1568
Flt Permitted	0.95	0.98			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1665	1718			3285		1736	3449		1752		1568
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	183	80	0	0	334	240	116	643	29	204	0	671
RTOR Reduction (vph)	0	0	0	0	131	0	0	3	0	0	0	516
Lane Group Flow (vph)	130	133	0	0	443	0	116	669	0	204	0	155
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	4%	4%	4%	3%	3%	3%
Turn Type	Split	NA			NA		Perm	NA		Prot		Perm
Protected Phases	2	2			6			4		3		
Permitted Phases							4					4
Actuated Green, G (s)	11.6	11.6			15.6		18.2	18.2		12.7		18.2
Effective Green, g (s)	13.6	13.6			17.6		20.2	20.2		14.7		20.2
Actuated g/C Ratio	0.16	0.16			0.20		0.23	0.23		0.17		0.23
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0		6.0
Vehicle Extension (s)	4.0	4.0			3.0		4.0	4.0		4.0		4.0
Lane Grp Cap (vph)	258	266			659		399	794		293		361
v/s Ratio Prot	c0.08	0.08			c0.13			c0.19		c0.12		
v/s Ratio Perm							0.07					0.10
v/c Ratio	0.50	0.50			0.67		0.29	0.84		0.70		0.43
Uniform Delay, d1	34.0	33.9			32.4		27.8	32.2		34.4		28.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	2.1	2.0			2.7		0.6	8.4		7.6		1.1
Delay (s)	36.1	35.9			35.1		28.4	40.6		41.9		29.9
Level of Service	D	D			D		C	D		D		C
Approach Delay (s)		36.0			35.1			38.8			32.7	
Approach LOS		D			D			D			C	
Intersection Summary												
HCM 2000 Control Delay			35.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			87.7			Sum of lost time (s)				20.0		
Intersection Capacity Utilization			68.4%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
19: N.Main St (NH106) & New Salem St

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	35	944	786	985
Future Volume (vph)	0	0	35	944	786	985
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	100	0			100
Storage Lanes	0	0	0			1
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	1314			300	305	
Travel Time (s)	29.9			6.8	6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	4%	4%	4%	4%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1088	873	1094
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

19: N.Main St (NH106) & New Salem St

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (veh/h)	0	0	35	944	786	985
Future Volume (Veh/h)	0	0	35	944	786	985
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	39	1049	873	1094
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				300	1190	
pX, platoon unblocked	0.87	0.78	0.78			
vC, conflicting volume	1476	873	873			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	697	695	695			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	94			
cM capacity (veh/h)	304	296	688			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	389	699	873	1094		
Volume Left	39	0	0	0		
Volume Right	0	0	0	1094		
cSH	688	1700	1700	1700		
Volume to Capacity	0.06	0.41	0.51	0.64		
Queue Length 95th (ft)	4	0	0	0		
Control Delay (s)	1.7	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	0.6		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			94.8%	ICU Level of Service	F	
Analysis Period (min)			15			

Lanes, Volumes, Timings
16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	270	95	0	0	429	276	229	554	65	247	0	795
Future Volume (vph)	270	95	0	0	429	276	229	554	65	247	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		150
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Shared Lane Traffic (%)	33%											
Lane Group Flow (vph)	201	205	0	0	784	0	254	688	0	271	0	874
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Split	NA			NA		Perm	NA		Prot		Perm
Protected Phases	2	2			6			4		3		
Permitted Phases							4					4
Detector Phase	2	2			6		4	4		3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	19.0	19.0			17.0		23.0	23.0		11.0		23.0
Total Split (s)	19.0	19.0			24.0		24.0	24.0		19.0		24.0
Total Split (%)	19.0%	19.0%			24.0%		24.0%	24.0%		19.0%		24.0%
Maximum Green (s)	13.0	13.0			18.0		18.0	18.0		13.0		18.0
Yellow Time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0		-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lead	Lead			Lag		Lead	Lead		Lag		Lead
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes		Yes		Yes
Vehicle Extension (s)	4.0	4.0			3.0		4.0	4.0		4.0		4.0
Recall Mode	Min	Min			Min		None	None		None		None
Walk Time (s)	0.0	0.0			0.0		0.0	0.0				0.0
Flash Dont Walk (s)	13.0	13.0			11.0		17.0	17.0				17.0
Pedestrian Calls (#/hr)	2	2			0		9	9				9
v/c Ratio	0.73	0.72			0.91		0.63	0.85		0.92		0.94
Control Delay	52.7	51.8			44.5		40.0	45.0		74.6		26.2
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0		0.0
Total Delay	52.7	51.8			44.5		40.0	45.0		74.6		26.2
Queue Length 50th (ft)	108	110			183		123	184		145		60
Queue Length 95th (ft)	#257	#257			#361		#255	#346		#347		#388

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	4.0	4.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100						50					150
Base Capacity (vph)	280	287			861		404	805		294		925
Starvation Cap Reductn	0	0			0		0	0		0		0
Spillback Cap Reductn	0	0			0		0	0		0		0
Storage Cap Reductn	0	0			0		0	0		0		0
Reduced v/c Ratio	0.72	0.71			0.91		0.63	0.85		0.92		0.94

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 88.6

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St



Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					 			 				
Traffic Volume (vph)	270	95	0	0	429	276	229	554	65	247	0	795
Future Volume (vph)	270	95	0	0	429	276	229	554	65	247	0	795
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
Lane Util. Factor	0.95	0.95			0.95		1.00	0.95		1.00		1.00
Frt	1.00	1.00			0.94		1.00	0.98		1.00		0.85
Flt Protected	0.95	0.98			1.00		0.95	1.00		0.95		1.00
Satd. Flow (prot)	1649	1695			3364		1787	3518		1736		1553
Flt Permitted	0.95	0.98			1.00		0.95	1.00		0.95		1.00
Satd. Flow (perm)	1649	1695			3364		1787	3518		1736		1553
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	300	106	0	0	477	307	254	616	72	271	0	874
RTOR Reduction (vph)	0	0	0	0	102	0	0	9	0	0	0	580
Lane Group Flow (vph)	201	205	0	0	682	0	254	679	0	271	0	294
Heavy Vehicles (%)	4%	4%	4%	1%	1%	1%	1%	1%	1%	4%	4%	4%
Turn Type	Split	NA			NA		Perm	NA		Prot		Perm
Protected Phases	2	2			6			4		3		
Permitted Phases							4					4
Actuated Green, G (s)	12.9	12.9			18.1		18.1	18.1		13.0		18.1
Effective Green, g (s)	14.9	14.9			20.1		20.1	20.1		15.0		20.1
Actuated g/C Ratio	0.16	0.16			0.22		0.22	0.22		0.16		0.22
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0		6.0
Vehicle Extension (s)	4.0	4.0			3.0		4.0	4.0		4.0		4.0
Lane Grp Cap (vph)	267	274			735		390	769		283		339
v/s Ratio Prot	c0.12	0.12			c0.20			c0.19		c0.16		
v/s Ratio Perm							0.14					0.19
v/c Ratio	0.75	0.75			0.93		0.65	0.88		0.96		0.87
Uniform Delay, d1	36.7	36.7			35.2		32.7	34.8		38.1		34.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	12.0	11.3			17.8		4.3	12.0		41.8		20.8
Delay (s)	48.8	48.0			53.0		37.0	46.8		80.0		55.4
Level of Service	D	D			D		D	D		E		E
Approach Delay (s)		48.4			53.0			44.1			61.2	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			52.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			91.9				Sum of lost time (s)		20.0			
Intersection Capacity Utilization			92.6%				ICU Level of Service		F			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
19: N.Main St (NH106) & New Salem St

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				  		
Traffic Volume (vph)	0	0	25	1091	1045	433
Future Volume (vph)	0	0	25	1091	1045	433
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	100	0			100
Storage Lanes	0	0	0			1
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	1314			300	305	
Travel Time (s)	29.9			6.8	6.9	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	3%	3%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	1240	1148	476
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis

19: N.Main St (NH106) & New Salem St

PM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (veh/h)	0	0	25	1091	1045	433
Future Volume (Veh/h)	0	0	25	1091	1045	433
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.91	0.91
Hourly flow rate (vph)	0	0	28	1212	1148	476
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				300	1190	
pX, platoon unblocked	0.57	0.48	0.48			
vC, conflicting volume	1810	1148	1148			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	857	765	765			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	93			
cM capacity (veh/h)	157	166	404			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	432	808	1148	476		
Volume Left	28	0	0	0		
Volume Right	0	0	0	476		
cSH	404	1700	1700	1700		
Volume to Capacity	0.07	0.48	0.68	0.28		
Queue Length 95th (ft)	6	0	0	0		
Control Delay (s)	2.2	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	0.8		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			64.4%		ICU Level of Service	C
Analysis Period (min)			15			

Lanes, Volumes, Timings

SAT 2037 B-MIT-Non Constrained_r1

16: N.Main St (NH106) & Veterans Square/Church St

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	124	65	0	0	390	146	237	394	91	128	0	0
Future Volume (vph)	124	65	0	0	390	146	237	394	91	128	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		500	50		50	0		150
Storage Lanes	1		0	0		0	1		1	1		1
Taper Length (ft)	100			25			100			0		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		666			650			1120			300	
Travel Time (s)		15.1			14.8			25.5			6.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Shared Lane Traffic (%)	25%											
Lane Group Flow (vph)	103	107	0	0	595	0	263	539	0	142	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Split	NA			NA		Perm	NA		Prot		Perm
Protected Phases	2	2			6			4		3		
Permitted Phases							4					4
Detector Phase	2	2			6		4	4		3		4
Switch Phase												
Minimum Initial (s)	5.0	5.0			5.0		5.0	5.0		5.0		5.0
Minimum Split (s)	19.0	19.0			17.0		23.0	23.0		11.0		23.0
Total Split (s)	19.0	19.0			24.0		24.0	24.0		19.0		24.0
Total Split (%)	19.0%	19.0%			24.0%		24.0%	24.0%		19.0%		24.0%
Maximum Green (s)	13.0	13.0			18.0		18.0	18.0		13.0		18.0
Yellow Time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
All-Red Time (s)	2.0	2.0			2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0		-2.0		-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lead	Lead			Lag		Lead	Lead		Lag		Lead
Lead-Lag Optimize?	Yes	Yes			Yes		Yes	Yes		Yes		Yes
Vehicle Extension (s)	4.0	4.0			3.0		4.0	4.0		4.0		4.0
Recall Mode	Min	Min			Min		None	None		None		None
Walk Time (s)	0.0	0.0			0.0		0.0	0.0				0.0
Flash Dont Walk (s)	13.0	13.0			11.0		17.0	17.0				17.0
Pedestrian Calls (#/hr)	2	2			0		9	9				9
v/c Ratio	0.40	0.40			0.73		0.64	0.66		0.49		
Control Delay	39.2	39.0			34.8		39.6	33.8		40.3		
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0		
Total Delay	39.2	39.0			34.8		39.6	33.8		40.3		
Queue Length 50th (ft)	51	53			140		125	128		68		
Queue Length 95th (ft)	118	122			#260		#272	224		148		

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	4.0	4.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		586			570			1040			220	
Turn Bay Length (ft)	100						50					
Base Capacity (vph)	306	317			870		430	856		326		
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	0.34	0.34			0.68		0.61	0.63		0.44		

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 83.6

Natural Cycle: 85

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 16: N.Main St (NH106) & Veterans Square/Church St



Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

16: N.Main St (NH106) & Veterans Square/Church St

SAT 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					 			 				
Traffic Volume (vph)	124	65	0	0	390	146	237	394	91	128	0	0
Future Volume (vph)	124	65	0	0	390	146	237	394	91	128	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0		
Lane Util. Factor	0.95	0.95			0.95		1.00	0.95		1.00		
Frt	1.00	1.00			0.96		1.00	0.97		1.00		
Flt Protected	0.95	0.98			1.00		0.95	1.00		0.95		
Satd. Flow (prot)	1681	1741			3428		1770	3440		1787		
Flt Permitted	0.95	0.98			1.00		0.95	1.00		0.95		
Satd. Flow (perm)	1681	1741			3428		1770	3440		1787		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	138	72	0	0	433	162	263	438	101	142	0	0
RTOR Reduction (vph)	0	0	0	0	37	0	0	19	0	0	0	0
Lane Group Flow (vph)	103	107	0	0	558	0	263	520	0	142	0	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	2%	2%	2%	1%	1%	1%
Turn Type	Split	NA			NA		Perm	NA		Prot		Perm
Protected Phases	2	2			6			4		3		
Permitted Phases							4					4
Actuated Green, G (s)	10.9	10.9			17.0		17.3	17.3		11.6		
Effective Green, g (s)	12.9	12.9			19.0		19.3	19.3		13.6		
Actuated g/C Ratio	0.15	0.15			0.22		0.22	0.22		0.16		
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0		6.0		
Vehicle Extension (s)	4.0	4.0			3.0		4.0	4.0		4.0		
Lane Grp Cap (vph)	250	259			753		395	768		281		
v/s Ratio Prot	0.06	c0.06			c0.16			c0.15		c0.08		
v/s Ratio Perm							0.15					
v/c Ratio	0.41	0.41			0.74		0.67	0.68		0.51		
Uniform Delay, d1	33.3	33.3			31.4		30.6	30.7		33.3		
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00		
Incremental Delay, d2	1.5	1.5			3.9		4.6	2.6		1.9		
Delay (s)	34.8	34.8			35.3		35.2	33.3		35.3		
Level of Service	C	C			D		D	C		D		
Approach Delay (s)		34.8			35.3			33.9			35.3	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			34.6									
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			86.4									
Intersection Capacity Utilization			54.8%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
19: N.Main St (NH106) & New Salem St

SAT 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	19	662	583	257
Future Volume (vph)	0	0	19	662	583	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	100	0			100
Storage Lanes	0	0	0			1
Taper Length (ft)	25		25			
Link Speed (mph)	30			30	30	
Link Distance (ft)	1314			300	305	
Travel Time (s)	29.9			6.8	6.9	
Peak Hour Factor	0.90	0.90	0.91	0.91	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	748	648	286
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	0			0	0	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized

HCM Unsignalized Intersection Capacity Analysis 19: N.Main St (NH106) & New Salem St

SAT 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				 		
Traffic Volume (veh/h)	0	0	19	662	583	257
Future Volume (Veh/h)	0	0	19	662	583	257
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.91	0.91	0.90	0.90
Hourly flow rate (vph)	0	0	21	727	648	286
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				300	1190	
pX, platoon unblocked	0.83	0.77	0.77			
vC, conflicting volume	1054	648	648			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	404	387	387			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	98			
cM capacity (veh/h)	463	468	894			
Direction, Lane #	NB 1	NB 2	SB 1	SB 2		
Volume Total	263	485	648	286		
Volume Left	21	0	0	0		
Volume Right	0	0	0	286		
cSH	894	1700	1700	1700		
Volume to Capacity	0.02	0.29	0.38	0.17		
Queue Length 95th (ft)	2	0	0	0		
Control Delay (s)	1.0	0.0	0.0	0.0		
Lane LOS	A					
Approach Delay (s)	0.3		0.0			
Approach LOS						
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			41.4%		ICU Level of Service	A
Analysis Period (min)			15			

ATTACHMENT L (Updated Rev1)

Intersection #13: Synchro (AM/PM/SAT)

2037 No-Build

2037 Build

2037 Build Mit

2037 Build Mit – NBL

2037 Build Mit Non-Constrained

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Canton St

AM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	25	401	74	62	18	236	490	5	2	420	192
Future Volume (vph)	257	25	401	74	62	18	236	490	5	2	420	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	75		0	500		0
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	376	535	0	197	0	284	596	0	0	496	226
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			12			3	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	36.0	36.0	14.0	26.0	26.0		14.0	45.0		31.0	31.0	31.0
Total Split (%)	32.1%	32.1%	12.5%	23.2%	23.2%		12.5%	40.2%		27.7%	27.7%	27.7%
Maximum Green (s)	30.0	30.0	10.0	20.0	20.0		10.0	39.0		25.0	25.0	25.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag			Lead				Lead			Lag	Lag	Lag
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.91	0.48		0.57		0.86	0.68			0.86	0.46
Control Delay		55.3	2.5		32.1		44.3	25.1			45.8	30.0
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		55.3	2.5		32.1		44.3	25.1			45.8	30.0
Queue Length 50th (ft)		170	0		72		85	209			226	88

Lanes, Volumes, Timings
 13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 NB
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	28%
Maximum Green (s)	25.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	1
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#389	5		178		#308	#525			#564	213
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			300				75					
Base Capacity (vph)		415	1109		343		332	872			579	493
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		0.91	0.48		0.57		0.86	0.68			0.86	0.46

Intersection Summary

Area Type: Other

Cycle Length: 112

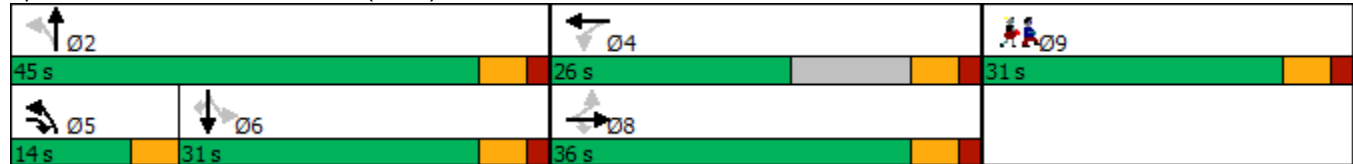
Actuated Cycle Length: 87.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	257	25	401	74	62	18	236	490	5	2	420	192
Future Volume (vph)	257	25	401	74	62	18	236	490	5	2	420	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.98		1.00	1.00			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1764	1568		1739		1736	1824			1844	1568
Flt Permitted		0.60	1.00		0.51		0.14	1.00			1.00	1.00
Satd. Flow (perm)		1112	1568		912		248	1824			1841	1568
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Adj. Flow (vph)	343	33	535	95	79	23	284	590	6	2	494	226
RTOR Reduction (vph)	0	0	275	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	376	260	0	193	0	284	595	0	0	496	226
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		30.5	40.7		30.5		39.7	39.7			25.5	25.5
Effective Green, g (s)		32.5	44.7		32.5		41.7	41.7			27.5	27.5
Actuated g/C Ratio		0.35	0.49		0.35		0.45	0.45			0.30	0.30
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		392	761		321		309	825			549	468
v/s Ratio Prot			0.05				c0.12	0.33				
v/s Ratio Perm		c0.34	0.12		0.21		0.29				c0.27	0.14
v/c Ratio		0.96	0.34		0.60		0.92	0.72			0.90	0.48
Uniform Delay, d1		29.2	14.6		24.5		22.7	20.5			31.0	26.5
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		34.5	0.3		3.2		30.7	3.1			18.2	0.8
Delay (s)		63.6	14.9		27.6		53.4	23.6			49.2	27.3
Level of Service		E	B		C		D	C			D	C
Approach Delay (s)		35.0			27.6			33.2			42.3	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.9				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			80.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Canton St

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	327	32	345	62	42	32	348	824	40	2	684	255
Future Volume (vph)	327	32	345	62	42	32	348	824	40	2	684	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	75		0	500		0
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	382	367	0	152	0	374	929	0	0	762	283
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			12			3	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	5	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	23.0	23.0	14.0	26.0	26.0		14.0	50.0		36.0	36.0	36.0
Total Split (%)	21.5%	21.5%	13.1%	24.3%	24.3%		13.1%	46.7%		33.6%	33.6%	33.6%
Maximum Green (s)	17.0	17.0	10.0	20.0	20.0		10.0	44.0		30.0	30.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag	Lead				Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.31	0.41		0.95		1.11	0.94			1.37	0.48
Control Delay		194.4	2.9		95.5		107.8	40.8			205.3	28.2
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		194.4	2.9		95.5		107.8	40.8			205.3	28.2
Queue Length 50th (ft)		~217	0		62		123	310			~448	91

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 NB
Timing Plan: NHDOT/City

Lane Group	Ø3	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	3	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	5.0
Minimum Split (s)	3.0	31.0
Total Split (s)	3.0	31.0
Total Split (%)	3%	29%
Maximum Green (s)	1.0	25.0
Yellow Time (s)	2.0	4.0
All-Red Time (s)	0.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		18.0
Pedestrian Calls (#/hr)		17
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#564	31		#249		#479	#1008			#1002	257
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			300				75					
Base Capacity (vph)		291	889		160		336	991			555	589
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.31	0.41		0.95		1.11	0.94			1.37	0.48

Intersection Summary

Area Type: Other

Cycle Length: 107

Actuated Cycle Length: 88.4

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St

 Ø2	 Ø4	 Ø9
50 s	23 s	31 s
 Ø5	 Ø8	
14 s	26 s	

Lane Group	Ø3	Ø9
------------	----	----

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	327	32	345	62	42	32	348	824	40	2	684	255
Future Volume (vph)	327	32	345	62	42	32	348	824	40	2	684	255
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1764	1568		1763		1770	1850			1863	1583
Flt Permitted		0.62	1.00		0.33		0.11	1.00			0.80	1.00
Satd. Flow (perm)		1138	1568		588		213	1850			1492	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	348	34	367	69	47	36	374	886	43	2	760	283
RTOR Reduction (vph)	0	0	228	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	382	139	0	142	0	374	928	0	0	762	283
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		20.6	30.9		20.6		45.2	45.2			30.9	30.9
Effective Green, g (s)		22.6	34.9		22.6		47.2	47.2			32.9	32.9
Actuated g/C Ratio		0.25	0.38		0.25		0.51	0.51			0.36	0.36
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		279	594		144		317	948			532	565
v/s Ratio Prot			0.03				c0.16	0.50				
v/s Ratio Perm		c0.34	0.06		0.24		0.45			c0.51	0.18	
v/c Ratio		1.37	0.23		0.99		1.18	0.98		1.43	0.50	
Uniform Delay, d1		34.8	19.5		34.6		26.4	22.0		29.6	23.2	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		187.3	0.2		70.6		108.7	23.8		205.2	0.7	
Delay (s)		222.1	19.7		105.2		135.0	45.7		234.8	23.9	
Level of Service		F	B		F		F	D		F	C	
Approach Delay (s)		122.9			105.2			71.4		177.7		
Approach LOS		F			F			E		F		
Intersection Summary												
HCM 2000 Control Delay			119.0				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.24									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)		18.0			
Intersection Capacity Utilization			118.4%				ICU Level of Service		H			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Canton St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	19	197	70	40	40	190	824	26	7	805	272
Future Volume (vph)	311	19	197	70	40	40	190	824	26	7	805	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	75		0	500		0
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	354	212	0	166	0	202	905	0	0	854	286
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			12			3	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	36.0	36.0	14.0	26.0	26.0		14.0	45.0		31.0	31.0	31.0
Total Split (%)	32.1%	32.1%	12.5%	23.2%	23.2%		12.5%	40.2%		27.7%	27.7%	27.7%
Maximum Green (s)	30.0	30.0	10.0	20.0	20.0		10.0	39.0		25.0	25.0	25.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag			Lead				Lead			Lag	Lag	Lag
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		0.83	0.22		0.41		0.60	1.01			2.59	0.56
Control Delay		44.7	1.9		24.7		24.2	57.8			741.9	32.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		44.7	1.9		24.7		24.2	57.8			741.9	32.3
Queue Length 50th (ft)		153	0		52		51	413			~729	116

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 NB
Timing Plan: NHDOT/City

Lane Group Ø9

Lane Configurations
Traffic Volume (vph)
Future Volume (vph)
Ideal Flow (vphpl)
Storage Length (ft)
Storage Lanes
Taper Length (ft)
Right Turn on Red
Link Speed (mph)
Link Distance (ft)
Travel Time (s)
Peak Hour Factor
Heavy Vehicles (%)
Shared Lane Traffic (%)
Lane Group Flow (vph)
Enter Blocked Intersection
Lane Alignment
Median Width(ft)
Link Offset(ft)
Crosswalk Width(ft)
Two way Left Turn Lane
Headway Factor
Turning Speed (mph)
Turn Type
Protected Phases 9
Permitted Phases
Detector Phase
Switch Phase
Minimum Initial (s) 5.0
Minimum Split (s) 31.0
Total Split (s) 31.0
Total Split (%) 28%
Maximum Green (s) 25.0
Yellow Time (s) 4.0
All-Red Time (s) 2.0
Lost Time Adjust (s)
Total Lost Time (s)
Lead/Lag
Lead-Lag Optimize?
Vehicle Extension (s) 3.0
Recall Mode None
Walk Time (s) 7.0
Flash Dont Walk (s) 18.0
Pedestrian Calls (#/hr) 5
v/c Ratio
Control Delay
Queue Delay
Total Delay
Queue Length 50th (ft)

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#468	20		163		#204	#1096			#1335	#311
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			300				75					
Base Capacity (vph)		429	974		402		341	896			330	510
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		0.83	0.22		0.41		0.59	1.01			2.59	0.56

Intersection Summary

Area Type: Other

Cycle Length: 112

Actuated Cycle Length: 87.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

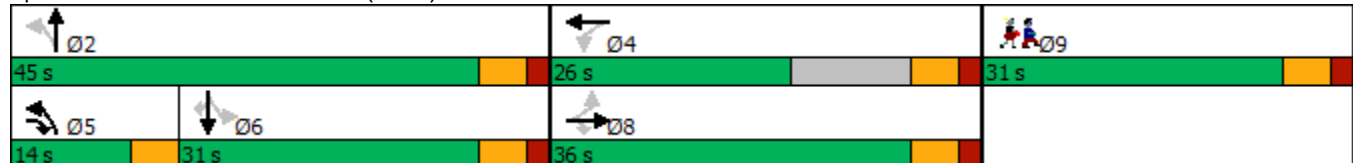
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 NB
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	311	19	197	70	40	40	190	824	26	7	805	272
Future Volume (vph)	311	19	197	70	40	40	190	824	26	7	805	272
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1779	1583		1755		1787	1872			1880	1599
Flt Permitted		0.62	1.00		0.59		0.13	1.00			0.55	1.00
Satd. Flow (perm)		1151	1583		1053		252	1872			1035	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	334	20	212	78	44	44	202	877	28	7	847	286
RTOR Reduction (vph)	0	0	110	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	354	102	0	156	0	202	904	0	0	854	286
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		30.5	40.3		30.5		39.7	39.7			25.9	25.9
Effective Green, g (s)		32.5	44.3		32.5		41.7	41.7			27.9	27.9
Actuated g/C Ratio		0.35	0.48		0.35		0.45	0.45			0.30	0.30
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		406	761		371		310	847			313	484
v/s Ratio Prot			0.02				0.08	c0.48				
v/s Ratio Perm		c0.31	0.05		0.15		0.21				c0.83	0.18
v/c Ratio		0.87	0.13		0.42		0.65	1.07			2.73	0.59
Uniform Delay, d1		27.9	13.3		22.6		19.6	25.2			32.1	27.3
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		18.2	0.1		0.8		4.8	50.5			786.8	1.9
Delay (s)		46.0	13.3		23.4		24.5	75.7			818.9	29.2
Level of Service		D	B		C		C	E			F	C
Approach Delay (s)		33.8			23.4			66.3			620.8	
Approach LOS		C			C			E			F	
Intersection Summary												
HCM 2000 Control Delay			269.9									F
HCM 2000 Volume to Capacity ratio			1.53									
Actuated Cycle Length (s)			92.1									
Intersection Capacity Utilization			122.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Canton St

AM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	75		0	500		0
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.25	0.83	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	506	609	0	197	0	334	1966	0	0	496	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			12			3	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	5	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	26.0	26.0	14.0	36.0	36.0		14.0	45.0		31.0	31.0	31.0
Total Split (%)	23.2%	23.2%	12.5%	32.1%	32.1%		12.5%	40.2%		27.7%	27.7%	27.7%
Maximum Green (s)	20.0	20.0	10.0	30.0	30.0		10.0	39.0		25.0	25.0	25.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag			Lead				Lead			Lag	Lag	Lag
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.23	0.54		0.88		1.01	2.25			1.28	0.61
Control Delay		152.5	3.0		64.1		74.4	586.5			173.7	34.0
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		152.5	3.0		64.1		74.4	586.5			173.7	34.0
Queue Length 50th (ft)		~309	5		85		115	~1609			~311	123

Lanes, Volumes, Timings
 13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B
 Timing Plan: NHDOT/City

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Right Turn on Red	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	5.0
Minimum Split (s)	31.0
Total Split (s)	31.0
Total Split (%)	28%
Maximum Green (s)	25.0
Yellow Time (s)	4.0
All-Red Time (s)	2.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	7.0
Flash Dont Walk (s)	18.0
Pedestrian Calls (#/hr)	5
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#570	9		#252		#387	398			#675	#303
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			300				75					
Base Capacity (vph)		410	1129		225		332	873			387	493
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.23	0.54		0.88		1.01	2.25			1.28	0.61

Intersection Summary

Area Type: Other

Cycle Length: 112

Actuated Cycle Length: 87.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

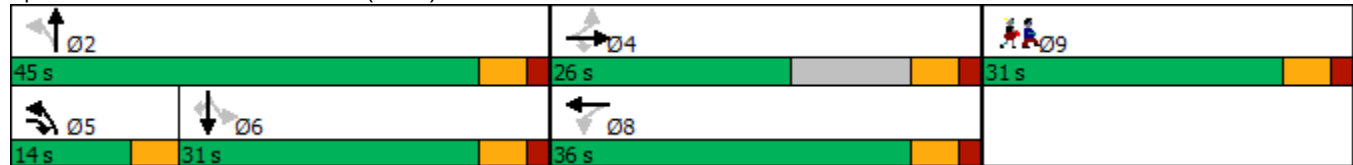
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group Ø9

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.98		1.00	1.00			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1762	1568		1739		1736	1826			1844	1568
Flt Permitted		0.60	1.00		0.33		0.14	1.00			0.67	1.00
Satd. Flow (perm)		1101	1568		595		248	1826			1230	1568
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.25	0.83	0.85	0.85	0.85
Adj. Flow (vph)	473	33	609	95	79	23	334	1960	6	2	494	299
RTOR Reduction (vph)	0	0	299	0	4	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	506	310	0	193	0	334	1966	0	0	496	299
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		30.5	40.7		30.5		39.7	39.7			25.5	25.5
Effective Green, g (s)		32.5	44.7		32.5		41.7	41.7			27.5	27.5
Actuated g/C Ratio		0.35	0.49		0.35		0.45	0.45			0.30	0.30
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		388	761		209		309	826			367	468
v/s Ratio Prot			0.05				0.14	c1.08				
v/s Ratio Perm		c0.46	0.14		0.32		0.35				0.40	0.19
v/c Ratio		1.30	0.41		0.92		1.08	2.38			1.35	0.64
Uniform Delay, d1		29.8	15.2		28.6		24.5	25.2			32.3	28.0
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		154.5	0.4		41.3		74.5	624.8			175.2	2.9
Delay (s)		184.3	15.6		70.0		99.0	650.0			207.5	30.9
Level of Service		F	B		E		F	F			F	C
Approach Delay (s)		92.1			70.0			570.0			141.1	
Approach LOS		F			E			F			F	
Intersection Summary												
HCM 2000 Control Delay			349.4				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.86									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			86.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Canton St

PM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	75		0	500		0
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	482	419	0	152	0	431	929	0	0	762	396
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			12			3	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	26.0	26.0	14.0	23.0	23.0		14.0	50.0		36.0	36.0	36.0
Total Split (%)	24.3%	24.3%	13.1%	21.5%	21.5%		13.1%	46.7%		33.6%	33.6%	33.6%
Maximum Green (s)	20.0	20.0	10.0	17.0	17.0		10.0	44.0		30.0	30.0	30.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag			Lead	Lag	Lag		Lead			Lag	Lag	Lag
Lead-Lag Optimize?			Yes	Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.67	0.46		2.20		1.28	0.94			1.37	0.67
Control Delay		342.8	3.0		608.9		171.8	40.8			205.3	33.9
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		342.8	3.0		608.9		171.8	40.8			205.3	33.9
Queue Length 50th (ft)		~319	0		~111		~189	310			~448	139

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B
Timing Plan: NHDOT/City

Lane Group	Ø3	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	3	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	5.0
Minimum Split (s)	3.0	31.0
Total Split (s)	3.0	31.0
Total Split (%)	3%	29%
Maximum Green (s)	1.0	25.0
Yellow Time (s)	2.0	4.0
All-Red Time (s)	0.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		18.0
Pedestrian Calls (#/hr)		17
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#724	33		#274		#571	#1008			#1002	#416
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			300				75					
Base Capacity (vph)		288	918		69		336	991			555	589
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.67	0.46		2.20		1.28	0.94			1.37	0.67

Intersection Summary

Area Type: Other

Cycle Length: 107

Actuated Cycle Length: 88.4

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

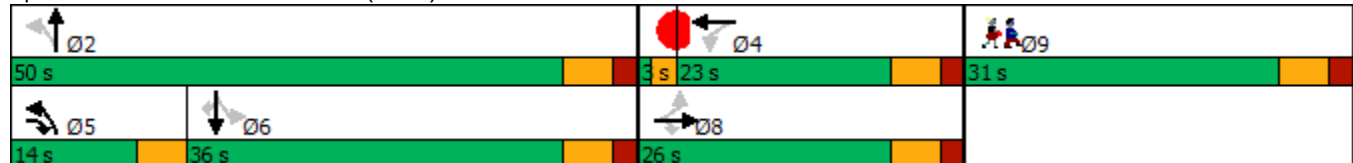
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø3	Ø9
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

PM 2037 B

13: Union Ave (3BUS) & Elm Street/Clinton St

Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1763	1568		1763		1770	1850			1863	1583
Flt Permitted		0.61	1.00		0.13		0.11	1.00			0.80	1.00
Satd. Flow (perm)		1129	1568		232		213	1850			1492	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	448	34	419	69	47	36	431	886	43	2	760	396
RTOR Reduction (vph)	0	0	260	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	482	159	0	142	0	431	928	0	0	762	396
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		20.6	30.9		20.6		45.2	45.2			30.9	30.9
Effective Green, g (s)		22.6	34.9		22.6		47.2	47.2			32.9	32.9
Actuated g/C Ratio		0.25	0.38		0.25		0.51	0.51			0.36	0.36
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		277	594		56		317	948			532	565
v/s Ratio Prot			0.04				c0.18	0.50				
v/s Ratio Perm		0.43	0.07		c0.61		0.51				c0.51	0.25
v/c Ratio		1.74	0.27		2.54		1.36	0.98			1.43	0.70
Uniform Delay, d1		34.8	19.8		34.8		26.4	22.0			29.6	25.4
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		347.7	0.2		742.1		181.0	23.8			205.2	3.9
Delay (s)		382.4	20.0		776.8		207.4	45.7			234.8	29.3
Level of Service		F	C		F		F	D			F	C
Approach Delay (s)		213.9			776.8			97.0			164.5	
Approach LOS		F			F			F			F	
Intersection Summary												
HCM 2000 Control Delay			177.3				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.61									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			123.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Canton St

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		300	0		0	75		0	500		0
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	451	272	0	166	0	265	905	0	0	854	386
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			0			12			3	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	5	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	11.0	11.0	11.0	11.0	11.0		11.0	11.0		11.0	11.0	11.0
Total Split (s)	26.0	26.0	14.0	36.0	36.0		14.0	45.0		31.0	31.0	31.0
Total Split (%)	23.2%	23.2%	12.5%	32.1%	32.1%		12.5%	40.2%		27.7%	27.7%	27.7%
Maximum Green (s)	20.0	20.0	10.0	30.0	30.0		10.0	39.0		25.0	25.0	25.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag	Lead				Lead			Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
v/c Ratio		1.06	0.27		0.53		0.77	1.01			2.64	0.77
Control Delay		88.8	1.9		29.7		35.1	57.8			763.3	40.7
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		88.8	1.9		29.7		35.1	57.8			763.3	40.7
Queue Length 50th (ft)		222	0		56		71	413			~730	170

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B
Timing Plan: NHDOT/City

Lane Group	Ø3	Ø9
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	3	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	4.0	5.0
Minimum Split (s)	10.0	31.0
Total Split (s)	10.0	31.0
Total Split (%)	9%	28%
Maximum Green (s)	4.0	25.0
Yellow Time (s)	4.0	4.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)		7.0
Flash Dont Walk (s)		18.0
Pedestrian Calls (#/hr)		5
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B
Timing Plan: NHDOT/City

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#631	22		#194		#314	#1096			#1336	#479
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			300				75					
Base Capacity (vph)		427	1000		313		342	896			324	503
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.06	0.27		0.53		0.77	1.01			2.64	0.77

Intersection Summary

Area Type: Other

Cycle Length: 112

Actuated Cycle Length: 87.2

Natural Cycle: 150

Control Type: Actuated-Uncoordinated

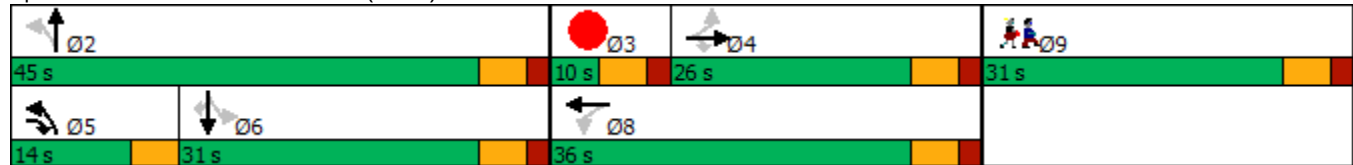
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø3	Ø9
------------	----	----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B
Timing Plan: NHDOT/City

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1778	1583		1755		1787	1872			1880	1599
Flt Permitted		0.61	1.00		0.45		0.14	1.00			0.55	1.00
Satd. Flow (perm)		1145	1583		813		255	1872			1030	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	431	20	272	78	44	44	265	877	28	7	847	386
RTOR Reduction (vph)	0	0	140	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	451	132	0	156	0	265	904	0	0	854	386
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4	5		8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Actuated Green, G (s)		30.5	40.7		30.5		39.7	39.7			25.5	25.5
Effective Green, g (s)		32.5	44.7		32.5		41.7	41.7			27.5	27.5
Actuated g/C Ratio		0.35	0.49		0.35		0.45	0.45			0.30	0.30
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		404	768		286		318	847			307	477
v/s Ratio Prot			0.02				0.11	c0.48				
v/s Ratio Perm		c0.39	0.06		0.19		0.27				c0.83	0.24
v/c Ratio		1.12	0.17		0.54		0.83	1.07			2.78	0.81
Uniform Delay, d1		29.8	13.3		23.9		21.0	25.2			32.3	29.9
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		80.2	0.1		2.1		16.8	50.5			810.8	9.8
Delay (s)		110.0	13.4		26.0		37.8	75.7			843.1	39.6
Level of Service		F	B		C		D	E			F	D
Approach Delay (s)		73.7			26.0			67.1			593.0	
Approach LOS		E			C			E			F	
Intersection Summary												
HCM 2000 Control Delay			264.2				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.78									
Actuated Cycle Length (s)			92.1				Sum of lost time (s)			22.0		
Intersection Capacity Utilization			127.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	75		0	0		500
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	506	609	0	197	0	334	596	0	0	496	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0	11.0	27.0	27.0		11.0	29.0		29.0	29.0	29.0
Total Split (s)	46.0	46.0	17.0	46.0	46.0		17.0	52.0		35.0	35.0	35.0
Total Split (%)	41.1%	41.1%	15.2%	41.1%	41.1%		15.2%	46.4%		31.3%	31.3%	31.3%
Maximum Green (s)	40.0	40.0	13.0	40.0	40.0		13.0	46.0		29.0	29.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag			Lag				Lag			Lead	Lead	Lead
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0			23.0		23.0	23.0	23.0
Pedestrian Calls (#/hr)	2	2		1	1			0		3	3	3
v/c Ratio		1.10	0.56		0.64		0.93	0.68			0.95	0.62
Control Delay		101.1	6.8		35.0		70.1	26.3			64.3	37.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		101.1	6.8		35.0		70.1	26.3			64.3	37.3
Queue Length 50th (ft)		~352	65		90		135	270			297	157

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT

Timing Plan: MIT

Lane Group	Ø11	Ø12
------------	-----	-----

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Ideal Flow (vphpl)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Right Turn on Red

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Shared Lane Traffic (%)

Lane Group Flow (vph)

Enter Blocked Intersection

Lane Alignment

Median Width(ft)

Link Offset(ft)

Crosswalk Width(ft)

Two way Left Turn Lane

Headway Factor

Turning Speed (mph)

Turn Type

Protected Phases	11	12
------------------	----	----

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s)	5.0	5.0
---------------------	-----	-----

Minimum Split (s)	7.0	7.0
-------------------	-----	-----

Total Split (s)	7.0	7.0
-----------------	-----	-----

Total Split (%)	6%	6%
-----------------	----	----

Maximum Green (s)	5.0	5.0
-------------------	-----	-----

Yellow Time (s)	2.0	2.0
-----------------	-----	-----

All-Red Time (s)	0.0	0.0
------------------	-----	-----

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s)	3.0	3.0
-----------------------	-----	-----

Recall Mode	None	None
-------------	------	------

Walk Time (s)	5.0	5.0
---------------	-----	-----

Flash Dont Walk (s)	0.0	0.0
---------------------	-----	-----

Pedestrian Calls (#/hr)	3	1
-------------------------	---	---

v/c Ratio

Control Delay

Queue Delay

Total Delay

Queue Length 50th (ft)

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#495	96		170		#319	440			#545	271
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			400				75					500
Base Capacity (vph)		461	1087		309		358	871			523	484
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.10	0.56		0.64		0.93	0.68			0.95	0.62

Intersection Summary

Area Type: Other

Cycle Length: 112

Actuated Cycle Length: 100.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

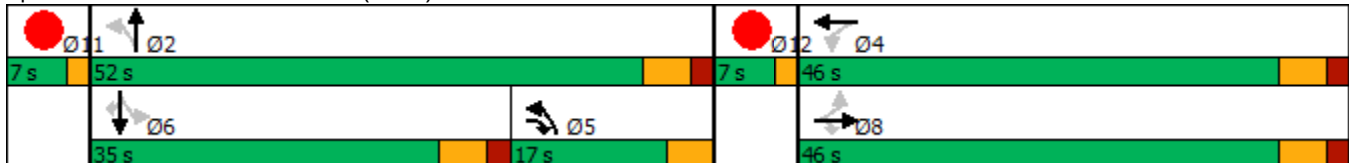
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT
Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.98		1.00	1.00			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1762	1568		1739		1736	1824			1844	1568
Flt Permitted		0.60	1.00		0.41		0.16	1.00			0.92	1.00
Satd. Flow (perm)		1105	1568		733		285	1824			1697	1568
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Adj. Flow (vph)	473	33	609	95	79	23	334	590	6	2	494	299
RTOR Reduction (vph)	0	0	161	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	506	448	0	193	0	334	595	0	0	496	299
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		40.1	53.1		40.1		48.1	46.1			29.1	29.1
Effective Green, g (s)		42.1	57.1		42.1		50.1	48.1			31.1	31.1
Actuated g/C Ratio		0.40	0.55		0.40		0.48	0.46			0.30	0.30
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		447	860		296		346	843			507	468
v/s Ratio Prot			0.08				c0.14	0.33				
v/s Ratio Perm		c0.46	0.21		0.26		c0.32			0.29	0.19	
v/c Ratio		1.13	0.52		0.65		0.97	0.71		0.98	0.64	
Uniform Delay, d1		30.9	14.8		25.0		37.3	22.3		36.1	31.6	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		83.9	0.6		5.1		38.8	2.7		34.0	2.9	
Delay (s)		114.8	15.4		30.1		76.1	25.0		70.1	34.4	
Level of Service		F	B		C		E	C		E	C	
Approach Delay (s)		60.5			30.1			43.4		56.7		
Approach LOS		E			C			D		E		
Intersection Summary												
HCM 2000 Control Delay			52.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			104.0			Sum of lost time (s)				14.0		
Intersection Capacity Utilization			86.0%			ICU Level of Service				E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	75		0	0		500
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	482	419	0	152	0	431	929	0	0	762	396
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0	11.0	27.0	27.0		11.0	29.0		29.0	29.0	29.0
Total Split (s)	35.0	35.0	20.0	35.0	35.0		20.0	61.0		41.0	41.0	41.0
Total Split (%)	31.8%	31.8%	18.2%	31.8%	31.8%		18.2%	55.5%		37.3%	37.3%	37.3%
Maximum Green (s)	29.0	29.0	14.0	29.0	29.0		14.0	55.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag			Lag				Lag			Lead	Lead	Lead
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0			23.0		23.0	23.0	23.0
Pedestrian Calls (#/hr)	4	4		5	5			2		6	6	6
v/c Ratio		1.34	0.45		0.82		1.19	0.87			1.53	0.67
Control Delay		202.8	6.2		64.3		143.0	29.0			275.2	33.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		202.8	6.2		64.3		143.0	29.0			275.2	33.3
Queue Length 50th (ft)		~380	40		77		~263	427			~647	194

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	8	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B-MIT

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#676	114		#226		#545	#907			#1026	366
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			400				75					500
Base Capacity (vph)		359	938		185		362	1071			498	594
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.34	0.45		0.82		1.19	0.87			1.53	0.67

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 98.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

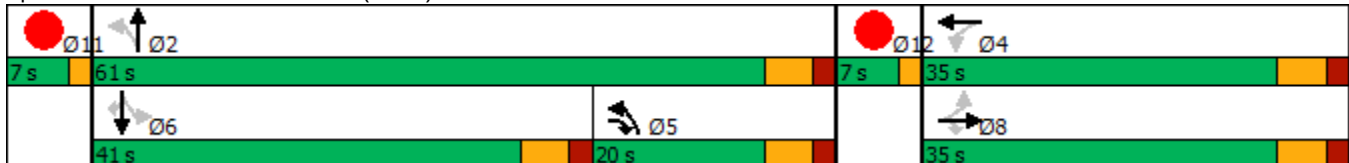
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B-MIT
Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1763	1568		1763		1770	1850			1863	1583
Flt Permitted		0.62	1.00		0.31		0.10	1.00			0.71	1.00
Satd. Flow (perm)		1143	1568		560		181	1850			1329	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	448	34	419	69	47	36	431	886	43	2	760	396
RTOR Reduction (vph)	0	0	152	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	482	267	0	142	0	431	928	0	0	762	396
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		29.1	43.2		29.1		55.2	55.2			35.1	35.1
Effective Green, g (s)		31.1	47.2		31.1		57.2	57.2			37.1	37.1
Actuated g/C Ratio		0.30	0.46		0.30		0.56	0.56			0.36	0.36
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		348	724		170		351	1036			482	575
v/s Ratio Prot			0.06				c0.19	0.50				
v/s Ratio Perm		c0.42	0.11		0.25		0.49			c0.57	0.25	
v/c Ratio		1.39	0.37		0.84		1.23	0.90		1.58	0.69	
Uniform Delay, d1		35.5	17.8		33.1		39.6	19.8		32.5	27.6	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		190.2	0.3		28.5		125.2	10.1		271.2	3.4	
Delay (s)		225.7	18.1		61.6		164.8	29.9		303.7	31.0	
Level of Service		F	B		E		F	C		F	C	
Approach Delay (s)		129.2			61.6			72.7		210.5		
Approach LOS		F			E			E		F		
Intersection Summary												
HCM 2000 Control Delay			131.1				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.41									
Actuated Cycle Length (s)			102.1				Sum of lost time (s)		16.0			
Intersection Capacity Utilization			123.6%				ICU Level of Service		H			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	75		0	0		500
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	451	272	0	166	0	265	905	0	0	854	386
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0	11.0	27.0	27.0		11.0	29.0		29.0	29.0	29.0
Total Split (s)	38.0	38.0	16.0	38.0	38.0		16.0	68.0		52.0	52.0	52.0
Total Split (%)	31.7%	31.7%	13.3%	31.7%	31.7%		13.3%	56.7%		43.3%	43.3%	43.3%
Maximum Green (s)	32.0	32.0	10.0	32.0	32.0		10.0	62.0		46.0	46.0	46.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag			Lag				Lag			Lead	Lead	Lead
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0			23.0		23.0	23.0	23.0
Pedestrian Calls (#/hr)	1	1		1	1			0		3	3	3
v/c Ratio		1.29	0.32		0.88		0.99	0.82			1.51	0.55
Control Delay		184.6	4.1		75.0		94.8	26.3			264.2	26.8
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		184.6	4.1		75.0		94.8	26.3			264.2	26.8
Queue Length 50th (ft)		~386	9		97		129	437			~799	184

Lanes, Volumes, Timings
 13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT

Timing Plan: MIT

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT
Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#677	57		#264		#355	#901			#1207	340
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			400				75					500
Base Capacity (vph)		349	853		189		267	1105			566	707
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.29	0.32		0.88		0.99	0.82			1.51	0.55

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 108.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

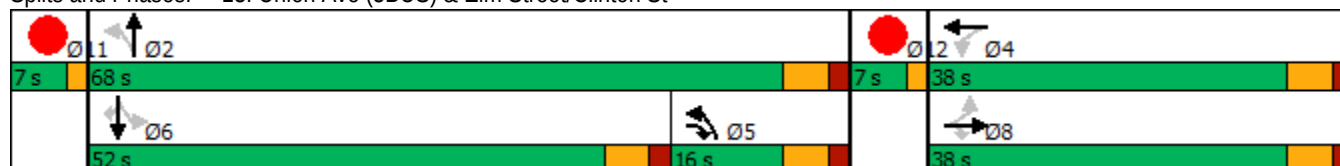
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1778	1583		1755		1787	1872			1880	1599
Flt Permitted		0.60	1.00		0.32		0.08	1.00			0.68	1.00
Satd. Flow (perm)		1116	1583		572		144	1872			1280	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	431	20	272	78	44	44	265	877	28	7	847	386
RTOR Reduction (vph)	0	0	146	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	451	126	0	156	0	265	904	0	0	854	386
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		32.1	42.2		32.1		62.2	62.2			46.1	46.1
Effective Green, g (s)		34.1	46.2		34.1		64.2	64.2			48.1	48.1
Actuated g/C Ratio		0.30	0.41		0.30		0.57	0.57			0.43	0.43
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		339	652		173		259	1072			549	686
v/s Ratio Prot			0.02				c0.11	0.48				
v/s Ratio Perm		c0.40	0.06		0.27		0.47				c0.67	0.24
v/c Ratio		1.33	0.19		0.90		1.02	0.84			1.56	0.56
Uniform Delay, d1		39.0	21.0		37.4		46.6	19.8			32.0	24.1
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		167.6	0.1		40.4		62.0	6.2			258.9	1.1
Delay (s)		206.6	21.2		77.8		108.7	26.0			290.9	25.1
Level of Service		F	C		E		F	C			F	C
Approach Delay (s)		136.9			77.8			44.7			208.1	
Approach LOS		F			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			128.0				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.38									
Actuated Cycle Length (s)			112.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			127.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	400		0	0		500
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	506	609	0	197	0	334	596	0	0	496	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0	11.0	27.0	27.0		11.0	29.0		29.0	29.0	29.0
Total Split (s)	46.0	46.0	17.0	46.0	46.0		17.0	52.0		35.0	35.0	35.0
Total Split (%)	41.1%	41.1%	15.2%	41.1%	41.1%		15.2%	46.4%		31.3%	31.3%	31.3%
Maximum Green (s)	40.0	40.0	13.0	40.0	40.0		13.0	46.0		29.0	29.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0		0.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lead/Lag			Lag				Lag			Lead	Lead	Lead
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0			23.0		23.0	23.0	23.0
Pedestrian Calls (#/hr)	2	2		1	1			0		3	3	3
v/c Ratio		1.10	0.56		0.64		0.93	0.68			0.95	0.62
Control Delay		101.1	6.8		35.0		70.1	26.3			64.3	37.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		101.1	6.8		35.0		70.1	26.3			64.3	37.3
Queue Length 50th (ft)		~352	65		90		135	270			297	157
Queue Length 95th (ft)		#495	96		170		#319	440			#545	271

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

Lane Group	Ø11	Ø12
------------	-----	-----

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Ideal Flow (vphpl)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Right Turn on Red

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Shared Lane Traffic (%)

Lane Group Flow (vph)

Enter Blocked Intersection

Lane Alignment

Median Width(ft)

Link Offset(ft)

Crosswalk Width(ft)

Two way Left Turn Lane

Headway Factor

Turn Type

Protected Phases 11 12

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 5.0 5.0

Minimum Split (s) 7.0 7.0

Total Split (s) 7.0 7.0

Total Split (%) 6% 6%

Maximum Green (s) 5.0 5.0

Yellow Time (s) 2.0 2.0

All-Red Time (s) 0.0 0.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0 3.0

Recall Mode None None

Walk Time (s) 5.0 5.0

Flash Dont Walk (s) 0.0 0.0

Pedestrian Calls (#/hr) 3 1

v/c Ratio

Control Delay

Queue Delay

Total Delay

Queue Length 50th (ft)

Queue Length 95th (ft)

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			400				400					500
Base Capacity (vph)		461	1087		309		358	871			523	484
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.10	0.56		0.64		0.93	0.68			0.95	0.62

Intersection Summary

Area Type: Other

Cycle Length: 112

Actuated Cycle Length: 100.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

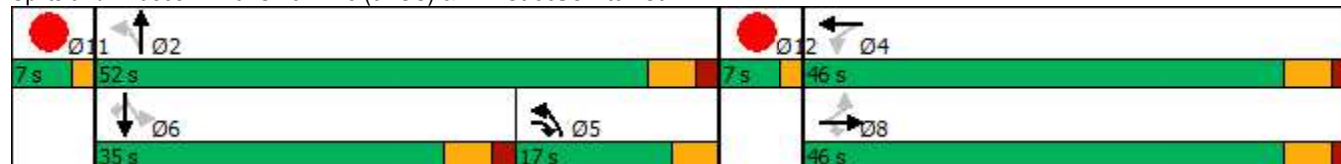
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

400' NBL
AM 2037 B-MIT

Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

400'
NBL

400' NBL
AM 2037 B-MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	2.0		4.0		2.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.98		1.00	1.00			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1762	1568		1739		1736	1824			1844	1568
Flt Permitted		0.60	1.00		0.41		0.16	1.00			0.92	1.00
Satd. Flow (perm)		1105	1568		733		285	1824			1697	1568
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Adj. Flow (vph)	473	33	609	95	79	23	334	590	6	2	494	299
RTOR Reduction (vph)	0	0	161	0	4	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	506	448	0	193	0	334	595	0	0	496	299
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		40.1	53.1		40.1		48.1	46.1			29.1	29.1
Effective Green, g (s)		42.1	57.1		42.1		50.1	48.1			31.1	31.1
Actuated g/C Ratio		0.40	0.55		0.40		0.48	0.46			0.30	0.30
Clearance Time (s)		6.0	4.0		6.0		4.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		447	860		296		346	843			507	468
v/s Ratio Prot			0.08				c0.14	0.33				
v/s Ratio Perm		c0.46	0.21		0.26		c0.32				0.29	0.19
v/c Ratio		1.13	0.52		0.65		0.97	0.71			0.98	0.64
Uniform Delay, d1		30.9	14.8		25.0		37.3	22.3			36.1	31.6
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		83.9	0.6		5.1		38.8	2.7			34.0	2.9
Delay (s)		114.8	15.4		30.1		76.1	25.0			70.1	34.4
Level of Service		F	B		C		E	C			E	C
Approach Delay (s)		60.5			30.1			43.4			56.7	
Approach LOS		E			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			52.3			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.04									
Actuated Cycle Length (s)			104.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			86.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	400		0	0		500
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	482	419	0	152	0	431	929	0	0	762	396
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0	11.0	27.0	27.0		11.0	29.0		29.0	29.0	29.0
Total Split (s)	35.0	35.0	20.0	35.0	35.0		20.0	61.0		41.0	41.0	41.0
Total Split (%)	31.8%	31.8%	18.2%	31.8%	31.8%		18.2%	55.5%		37.3%	37.3%	37.3%
Maximum Green (s)	29.0	29.0	14.0	29.0	29.0		14.0	55.0		35.0	35.0	35.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag			Lag				Lag			Lead	Lead	Lead
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0			23.0		23.0	23.0	23.0
Pedestrian Calls (#/hr)	4	4		5	5			2		6	6	6
v/c Ratio		1.34	0.45		0.82		1.19	0.87			1.53	0.67
Control Delay		202.8	6.2		64.3		143.0	29.0			275.2	33.3
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		202.8	6.2		64.3		143.0	29.0			275.2	33.3
Queue Length 50th (ft)		~380	40		77		~263	427			~647	194
Queue Length 95th (ft)		#676	114		#226		#545	#907			#1026	366

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

Lane Group	Ø11	Ø12
------------	-----	-----

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Ideal Flow (vphpl)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Right Turn on Red

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Shared Lane Traffic (%)

Lane Group Flow (vph)

Enter Blocked Intersection

Lane Alignment

Median Width(ft)

Link Offset(ft)

Crosswalk Width(ft)

Two way Left Turn Lane

Headway Factor

Turn Type

Protected Phases 11 12

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 5.0 5.0

Minimum Split (s) 7.0 7.0

Total Split (s) 7.0 7.0

Total Split (%) 6% 6%

Maximum Green (s) 5.0 5.0

Yellow Time (s) 2.0 2.0

All-Red Time (s) 0.0 0.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0 3.0

Recall Mode None None

Walk Time (s) 5.0 5.0

Flash Dont Walk (s) 0.0 0.0

Pedestrian Calls (#/hr) 8 9

v/c Ratio

Control Delay

Queue Delay

Total Delay

Queue Length 50th (ft)

Queue Length 95th (ft)

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			400				400					500
Base Capacity (vph)		359	938		185		362	1071			498	594
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.34	0.45		0.82		1.19	0.87			1.53	0.67

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 98.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

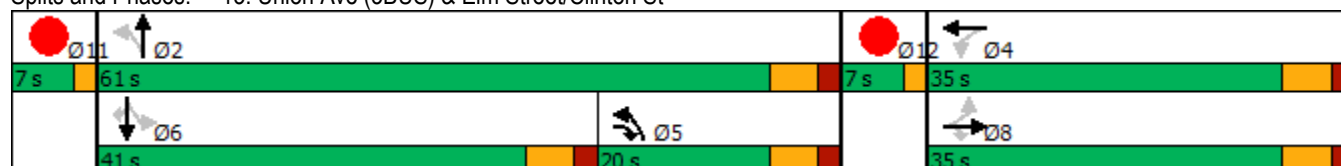
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

400' NBL
PM 2037 B-MIT

Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

400'
NBL

400' NBL
PM 2037 B-MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.97		1.00	0.99			1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1763	1568		1763		1770	1850			1863	1583
Flt Permitted		0.62	1.00		0.31		0.10	1.00			0.71	1.00
Satd. Flow (perm)		1143	1568		560		181	1850			1329	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	448	34	419	69	47	36	431	886	43	2	760	396
RTOR Reduction (vph)	0	0	152	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	482	267	0	142	0	431	928	0	0	762	396
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		29.1	43.2		29.1		55.2	55.2			35.1	35.1
Effective Green, g (s)		31.1	47.2		31.1		57.2	57.2			37.1	37.1
Actuated g/C Ratio		0.30	0.46		0.30		0.56	0.56			0.36	0.36
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		348	724		170		351	1036			482	575
v/s Ratio Prot			0.06				c0.19	0.50				
v/s Ratio Perm		c0.42	0.11		0.25		0.49				c0.57	0.25
v/c Ratio		1.39	0.37		0.84		1.23	0.90			1.58	0.69
Uniform Delay, d1		35.5	17.8		33.1		39.6	19.8			32.5	27.6
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		190.2	0.3		28.5		125.2	10.1			271.2	3.4
Delay (s)		225.7	18.1		61.6		164.8	29.9			303.7	31.0
Level of Service		F	B		E		F	C			F	C
Approach Delay (s)		129.2			61.6			72.7			210.5	
Approach LOS		F			E			E			F	
Intersection Summary												
HCM 2000 Control Delay			131.1				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.41									
Actuated Cycle Length (s)			102.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			123.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	400		0	0		500
Storage Lanes	0		1	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			No
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			6259			7662	
Travel Time (s)		9.2			11.4			142.3			174.1	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	451	272	0	166	0	265	905	0	0	854	386
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Detector Phase	8	8	5	4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0	11.0	27.0	27.0		11.0	29.0		29.0	29.0	29.0
Total Split (s)	38.0	38.0	16.0	38.0	38.0		16.0	68.0		52.0	52.0	52.0
Total Split (%)	31.7%	31.7%	13.3%	31.7%	31.7%		13.3%	56.7%		43.3%	43.3%	43.3%
Maximum Green (s)	32.0	32.0	10.0	32.0	32.0		10.0	62.0		46.0	46.0	46.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lead/Lag			Lag				Lag			Lead	Lead	Lead
Lead-Lag Optimize?			Yes				Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0		0.0	0.0			0.0		0.0	0.0	0.0
Flash Dont Walk (s)	21.0	21.0		21.0	21.0			23.0		23.0	23.0	23.0
Pedestrian Calls (#/hr)	1	1		1	1			0		3	3	3
v/c Ratio		1.29	0.32		0.88		0.99	0.82			1.51	0.55
Control Delay		184.6	4.1		75.0		94.8	26.3			264.2	26.8
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0	0.0
Total Delay		184.6	4.1		75.0		94.8	26.3			264.2	26.8
Queue Length 50th (ft)		~386	9		97		129	437			~799	184
Queue Length 95th (ft)		#677	57		#264		#355	#901			#1207	340

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

Lane Group	Ø11	Ø12
------------	-----	-----

Lane Configurations

Traffic Volume (vph)

Future Volume (vph)

Ideal Flow (vphpl)

Storage Length (ft)

Storage Lanes

Taper Length (ft)

Right Turn on Red

Link Speed (mph)

Link Distance (ft)

Travel Time (s)

Peak Hour Factor

Heavy Vehicles (%)

Shared Lane Traffic (%)

Lane Group Flow (vph)

Enter Blocked Intersection

Lane Alignment

Median Width(ft)

Link Offset(ft)

Crosswalk Width(ft)

Two way Left Turn Lane

Headway Factor

Turn Type

Protected Phases 11 12

Permitted Phases

Detector Phase

Switch Phase

Minimum Initial (s) 5.0 5.0

Minimum Split (s) 7.0 7.0

Total Split (s) 7.0 7.0

Total Split (%) 6% 6%

Maximum Green (s) 5.0 5.0

Yellow Time (s) 2.0 2.0

All-Red Time (s) 0.0 0.0

Lost Time Adjust (s)

Total Lost Time (s)

Lead/Lag

Lead-Lag Optimize?

Vehicle Extension (s) 3.0 3.0

Recall Mode None None

Walk Time (s) 5.0 5.0

Flash Dont Walk (s) 0.0 0.0

Pedestrian Calls (#/hr) 3 2

v/c Ratio

Control Delay

Queue Delay

Total Delay

Queue Length 50th (ft)

Queue Length 95th (ft)

Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		325			420			6179			7582	
Turn Bay Length (ft)			400				400					500
Base Capacity (vph)		349	853		189		267	1105			566	707
Starvation Cap Reductn		0	0		0		0	0			0	0
Spillback Cap Reductn		0	0		0		0	0			0	0
Storage Cap Reductn		0	0		0		0	0			0	0
Reduced v/c Ratio		1.29	0.32		0.88		0.99	0.82			1.51	0.55

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 108.8

Natural Cycle: 145

Control Type: Actuated-Uncoordinated

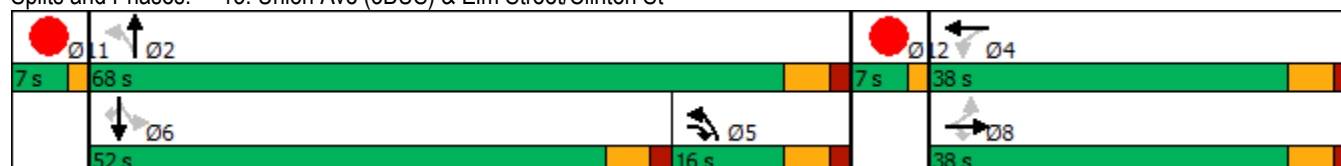
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lanes, Volumes, Timings

13: Union Ave (3BUS) & Elm Street/Clinton St

Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

400'
NBL

400' NBL
SAT 2037 B-MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0			4.0	4.0
Lane Util. Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Frt		1.00	0.85		0.96		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1778	1583		1755		1787	1872			1880	1599
Flt Permitted		0.60	1.00		0.32		0.08	1.00			0.68	1.00
Satd. Flow (perm)		1116	1583		572		144	1872			1280	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	431	20	272	78	44	44	265	877	28	7	847	386
RTOR Reduction (vph)	0	0	146	0	10	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	451	126	0	156	0	265	904	0	0	854	386
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		8	5		4		5	2			6	
Permitted Phases	8		8	4			2			6		6
Actuated Green, G (s)		32.1	42.2		32.1		62.2	62.2			46.1	46.1
Effective Green, g (s)		34.1	46.2		34.1		64.2	64.2			48.1	48.1
Actuated g/C Ratio		0.30	0.41		0.30		0.57	0.57			0.43	0.43
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		339	652		173		259	1072			549	686
v/s Ratio Prot			0.02				c0.11	0.48				
v/s Ratio Perm		c0.40	0.06		0.27		0.47				c0.67	0.24
v/c Ratio		1.33	0.19		0.90		1.02	0.84			1.56	0.56
Uniform Delay, d1		39.0	21.0		37.4		46.6	19.8			32.0	24.1
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		167.6	0.1		40.4		62.0	6.2			258.9	1.1
Delay (s)		206.6	21.2		77.8		108.7	26.0			290.9	25.1
Level of Service		F	C		E		F	C			F	C
Approach Delay (s)		136.9			77.8			44.7			208.1	
Approach LOS		F			E			D			F	
Intersection Summary												
HCM 2000 Control Delay			128.0				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			1.38									
Actuated Cycle Length (s)			112.1				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			127.6%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	400		0	0		500
Storage Lanes	1		0	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			802			7662	
Travel Time (s)		9.2			11.4			18.2			174.1	
Peak Hour Factor	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	473	642	0	0	197	0	334	596	0	0	496	299
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Split	NA		Split	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	8	8		4	4		5	2			6	
Permitted Phases							2			6		6
Detector Phase	8	8		4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0		11.0	11.0		11.0	27.0		26.0	26.0	26.0
Total Split (s)	30.0	30.0		16.0	16.0		14.0	40.0		26.0	26.0	26.0
Total Split (%)	30.0%	30.0%		16.0%	16.0%		14.0%	40.0%		26.0%	26.0%	26.0%
Maximum Green (s)	24.0	24.0		10.0	10.0		8.0	34.0		20.0	20.0	20.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0						0.0		0.0	0.0	0.0
Flash Dont Walk (s)	23.0	23.0						21.0		20.0	20.0	20.0
Pedestrian Calls (#/hr)	7	7						5		4	4	4
v/c Ratio	0.90	0.77			0.80		0.93	0.44			0.64	0.50
Control Delay	52.9	13.9			62.3		64.0	21.0			34.9	7.1
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	52.9	13.9			62.3		64.0	21.0			34.9	7.1
Queue Length 50th (ft)	243	53			102		127	115			123	0
Queue Length 95th (ft)	#385	91			#206		#314	184			195	54

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	9	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		325			420			722			7582	
Turn Bay Length (ft)							400					500
Base Capacity (vph)	526	834			245		361	1441			848	621
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.90	0.77			0.80		0.93	0.41			0.58	0.48

Intersection Summary

Area Type: Other

Cycle Length: 100

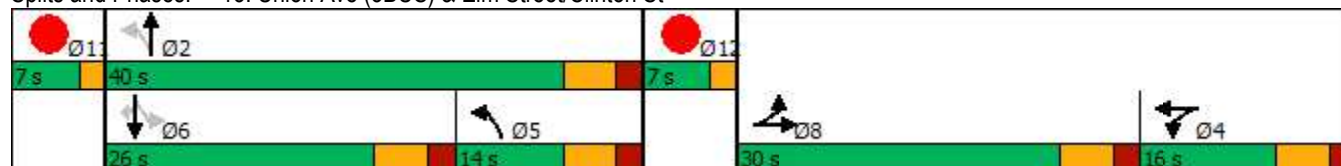
Actuated Cycle Length: 87.1

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

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

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Future Volume (vph)	355	25	457	74	62	18	277	490	5	2	420	254
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			0.95	1.00
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1582			1739		1736	3466			3504	1568
Flt Permitted	0.95	1.00			0.98		0.32	1.00			0.95	1.00
Satd. Flow (perm)	1752	1582			1739		579	3466			3338	1568
Peak-hour factor, PHF	0.75	0.75	0.75	0.78	0.78	0.78	0.83	0.83	0.83	0.85	0.85	0.85
Adj. Flow (vph)	473	33	609	95	79	23	334	590	6	2	494	299
RTOR Reduction (vph)	0	365	0	0	4	0	0	1	0	0	0	232
Lane Group Flow (vph)	473	277	0	0	193	0	334	595	0	0	496	67
Heavy Vehicles (%)	3%	3%	3%	5%	5%	5%	4%	4%	4%	3%	3%	3%
Turn Type	Split	NA		Split	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	8	8		4	4		5	2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	24.1	24.1			10.1		32.3	32.3			18.2	18.2
Effective Green, g (s)	26.1	26.1			12.1		34.3	34.3			20.2	20.2
Actuated g/C Ratio	0.29	0.29			0.13		0.38	0.38			0.22	0.22
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	506	457			233		349	1316			746	350
v/s Ratio Prot	c0.27	0.18			c0.11		c0.11	0.17				
v/s Ratio Perm							c0.26				0.15	0.04
v/c Ratio	0.93	0.61			0.83		0.96	0.45			0.66	0.19
Uniform Delay, d1	31.3	27.7			38.1		30.4	21.0			32.0	28.4
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	24.6	2.3			20.7		36.6	0.2			2.2	0.3
Delay (s)	55.9	30.0			58.8		66.9	21.2			34.2	28.7
Level of Service	E	C			E		E	C			C	C
Approach Delay (s)		41.0			58.8			37.6			32.1	
Approach LOS		D			E			D			C	
Intersection Summary												
HCM 2000 Control Delay			38.8				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			90.3				Sum of lost time (s)		20.0			
Intersection Capacity Utilization			78.4%				ICU Level of Service		D			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	300		0	0		500
Storage Lanes	1		0	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			802			7662	
Travel Time (s)		9.2			11.4			18.2			174.1	
Peak Hour Factor	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	448	453	0	0	152	0	431	929	0	0	762	396
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Split	NA		Split	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	8	8		4	4		5	2			6	
Permitted Phases							2			6		6
Detector Phase	8	8		4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0		11.0	11.0		11.0	27.0		26.0	26.0	26.0
Total Split (s)	33.0	33.0		15.0	15.0		28.0	58.0		30.0	30.0	30.0
Total Split (%)	27.5%	27.5%		12.5%	12.5%		23.3%	48.3%		25.0%	25.0%	25.0%
Maximum Green (s)	27.0	27.0		9.0	9.0		22.0	52.0		24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0						0.0		0.0	0.0	0.0
Flash Dont Walk (s)	23.0	23.0						21.0		20.0	20.0	20.0
Pedestrian Calls (#/hr)	7	7						5		4	4	4
v/c Ratio	0.96	0.62			0.81		0.94	0.53			0.95	0.58
Control Delay	72.8	9.0			76.9		67.8	20.5			63.1	7.6
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	72.8	9.0			76.9		67.8	20.5			63.1	7.6
Queue Length 50th (ft)	297	17			96		233	211			266	0

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	9	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#586	124			#239		#513	342			#463	86
Internal Link Dist (ft)		325			420			722			7582	
Turn Bay Length (ft)							300					500
Base Capacity (vph)	468	731			187		459	1750			803	680
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.96	0.62			0.81		0.94	0.53			0.95	0.58

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 108.8

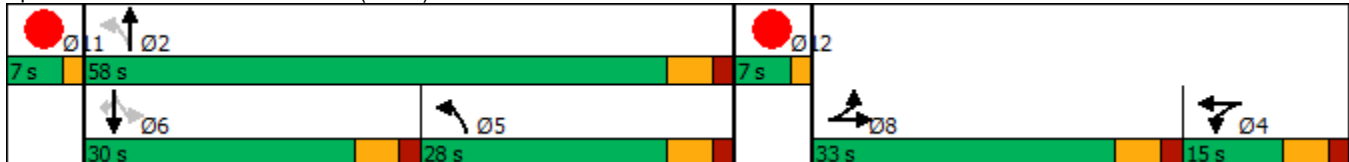
Natural Cycle: 115

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Future Volume (vph)	421	32	394	62	42	32	401	824	40	2	684	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			0.95	1.00
Frt	1.00	0.86			0.97		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1752	1589			1763		1770	3515			3539	1583
Flt Permitted	0.95	1.00			0.98		0.13	1.00			0.95	1.00
Satd. Flow (perm)	1752	1589			1763		248	3515			3356	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.90	0.90	0.90	0.93	0.93	0.93	0.90	0.90	0.90
Adj. Flow (vph)	448	34	419	69	47	36	431	886	43	2	760	396
RTOR Reduction (vph)	0	310	0	0	9	0	0	3	0	0	0	304
Lane Group Flow (vph)	448	143	0	0	143	0	431	926	0	0	762	92
Heavy Vehicles (%)	3%	3%	3%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Split	NA		Split	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	8	8		4	4		5	2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	27.1	27.1			9.0		52.2	52.2			24.1	24.1
Effective Green, g (s)	29.1	29.1			11.0		54.2	54.2			26.1	26.1
Actuated g/C Ratio	0.26	0.26			0.10		0.48	0.48			0.23	0.23
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	454	412			172		447	1699			781	368
v/s Ratio Prot	c0.26	0.09			c0.08		c0.21	0.26				
v/s Ratio Perm							c0.26				0.23	0.06
v/c Ratio	0.99	0.35			0.83		0.96	0.55			0.98	0.25
Uniform Delay, d1	41.3	33.8			49.6		38.1	20.3			42.7	35.0
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	38.4	0.5			27.5		33.2	0.4			26.0	0.4
Delay (s)	79.7	34.3			77.2		71.2	20.7			68.7	35.4
Level of Service	E	C			E		E	C			E	D
Approach Delay (s)		56.9			77.2			36.7			57.3	
Approach LOS		E			E			D			E	
Intersection Summary												
HCM 2000 Control Delay			50.2				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			112.1				Sum of lost time (s)			20.0		
Intersection Capacity Utilization			90.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		400	0		0	300		0	0		500
Storage Lanes	1		0	0		0	1		0	0		1
Taper Length (ft)	25			25			100			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		405			500			802			7662	
Travel Time (s)		9.2			11.4			18.2			174.1	
Peak Hour Factor	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	431	292	0	0	166	0	265	905	0	0	854	386
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Split	NA		Split	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	8	8		4	4		5	2			6	
Permitted Phases							2			6		6
Detector Phase	8	8		4	4		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Minimum Split (s)	29.0	29.0		11.0	11.0		11.0	27.0		26.0	26.0	26.0
Total Split (s)	33.0	33.0		15.0	15.0		28.0	58.0		30.0	30.0	30.0
Total Split (%)	27.5%	27.5%		12.5%	12.5%		23.3%	48.3%		25.0%	25.0%	25.0%
Maximum Green (s)	27.0	27.0		9.0	9.0		22.0	52.0		24.0	24.0	24.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0		-2.0	-2.0			-2.0	-2.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lead	Lead		Lag	Lag		Lag			Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		Min	Min	Min
Walk Time (s)	0.0	0.0						0.0		0.0	0.0	0.0
Flash Dont Walk (s)	23.0	23.0						21.0		20.0	20.0	20.0
Pedestrian Calls (#/hr)	7	7						5		4	4	4
v/c Ratio	0.86	0.45			0.83		0.70	0.55			1.05	0.56
Control Delay	53.9	7.8			75.5		44.7	21.4			82.6	7.1
Queue Delay	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Delay	53.9	7.8			75.5		44.7	21.4			82.6	7.1
Queue Length 50th (ft)	256	9			97		104	203			~296	0

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	5.0	5.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	9	9
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#551	86			#264		227	329			#558	85
Internal Link Dist (ft)		325			420			722			7582	
Turn Bay Length (ft)							300					500
Base Capacity (vph)	503	650			200		493	1885			816	695
Starvation Cap Reductn	0	0			0		0	0			0	0
Spillback Cap Reductn	0	0			0		0	0			0	0
Storage Cap Reductn	0	0			0		0	0			0	0
Reduced v/c Ratio	0.86	0.45			0.83		0.54	0.48			1.05	0.56

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 102.7

Natural Cycle: 95

Control Type: Actuated-Uncoordinated

~ 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.

Splits and Phases: 13: Union Ave (3BUS) & Elm Street/Clinton St



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

13: Union Ave (3BUS) & Elm Street/Clinton St

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Future Volume (vph)	401	19	253	70	40	40	249	824	26	7	805	367
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			0.95	1.00
Frt	1.00	0.86			0.96		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1770	1602			1755		1787	3558			3573	1599
Flt Permitted	0.95	1.00			0.98		0.13	1.00			0.90	1.00
Satd. Flow (perm)	1770	1602			1755		249	3558			3201	1599
Peak-hour factor, PHF	0.93	0.93	0.93	0.90	0.90	0.90	0.94	0.94	0.94	0.95	0.95	0.95
Adj. Flow (vph)	431	20	272	78	44	44	265	877	28	7	847	386
RTOR Reduction (vph)	0	197	0	0	11	0	0	2	0	0	0	291
Lane Group Flow (vph)	431	95	0	0	155	0	265	903	0	0	854	95
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Split	NA		Split	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	8	8		4	4		5	2			6	
Permitted Phases							2			6		6
Actuated Green, G (s)	27.2	27.2			9.1		45.9	45.9			24.2	24.2
Effective Green, g (s)	29.2	29.2			11.1		47.9	47.9			26.2	26.2
Actuated g/C Ratio	0.28	0.28			0.10		0.45	0.45			0.25	0.25
Clearance Time (s)	6.0	6.0			6.0		6.0	6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	487	441			183		369	1607			791	395
v/s Ratio Prot	c0.24	0.06			c0.09		c0.12	0.25				
v/s Ratio Perm							0.20				c0.27	0.06
v/c Ratio	0.89	0.22			0.85		0.72	0.56			1.08	0.24
Uniform Delay, d1	36.8	29.6			46.6		36.6	21.3			39.9	31.9
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	17.2	0.2			28.8		6.5	0.5			55.7	0.3
Delay (s)	54.0	29.8			75.4		43.1	21.8			95.6	32.3
Level of Service	D	C			E		D	C			F	C
Approach Delay (s)		44.3			75.4			26.6			75.9	
Approach LOS		D			E			C			E	

Intersection Summary

HCM 2000 Control Delay	51.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	106.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

ATTACHMENT O (Updated Rev1)

Intersections #18 & #21: Coord: Synchro (AM/PM/SAT)

2037 Build Mit Coord

2037 Build Mit Coord with Lanes

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

AM 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Future Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		25	0		175	150		150	100		75
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			175			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			600			501			6259	
Travel Time (s)		4.5			13.6			11.4			142.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	11	1	0	524	340	1	668	20	216	453	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			20			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3		3	3		3			2	2		
Detector Phase	3	3	3	3	3	3	1	2	2	1	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	11.0	24.0	24.0	11.0	24.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	13.0	47.0	47.0	13.0	47.0	
Total Split (%)	38.3%	38.3%	38.3%	38.3%	38.3%	38.3%	10.8%	39.2%	39.2%	10.8%	39.2%	
Maximum Green (s)	40.0	40.0	40.0	40.0	40.0	40.0	7.0	41.0	41.0	7.0	41.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Flash Dont Walk (s)	25.0	25.0	25.0	25.0	25.0	25.0		15.0	15.0		15.0	
Pedestrian Calls (#/hr)	2	2	2	2	2	2		3	3		3	
v/c Ratio		0.02	0.00		0.95	0.44	0.01	0.89	0.03	1.10	0.61	
Control Delay		23.7	0.0		63.1	10.0	43.0	30.4	0.1	135.8	33.0	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.7	0.0	0.0	0.6	
Total Delay		23.7	0.0		63.1	10.0	43.0	31.1	0.1	135.8	33.6	
Queue Length 50th (ft)		5	0		379	48	1	501	0	~132	267	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

AM 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		19	0		#665	137	m1	m#592	m0	#307	418	
Internal Link Dist (ft)		120			520			421			6179	
Turn Bay Length (ft)			25			175	150		150	100		
Base Capacity (vph)		566	699		554	772	131	747	705	196	747	
Starvation Cap Reductn		0	0		0	0	0	10	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	86	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.02	0.00		0.95	0.44	0.01	0.91	0.03	1.10	0.69	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 6 (5%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

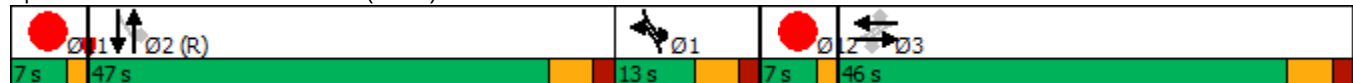
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 18: Union Ave (3BUS) & Rite Aid/Gilford Ave



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

18: Union Ave (3BUS) & Rite Aid/Gilford Ave

AM 2037 B-MIT-L

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Future Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1790	1583		1770	1583	1752	1845	1568	1752	1844	
Flt Permitted		0.77	1.00		0.75	1.00	0.95	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1428	1583		1398	1583	1752	1845	1568	163	1844	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	9	2	1	524	0	340	1	668	20	216	452	1
RTOR Reduction (vph)	0	0	1	0	0	145	0	0	12	0	0	0
Lane Group Flow (vph)	0	11	0	0	524	195	1	668	8	216	453	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3		3	3		3			2	2		
Actuated Green, G (s)		45.6	45.6		45.6	45.6	7.0	43.4	43.4	50.4	43.4	
Effective Green, g (s)		47.6	47.6		47.6	47.6	9.0	45.4	45.4	54.4	45.4	
Actuated g/C Ratio		0.40	0.40		0.40	0.40	0.08	0.38	0.38	0.45	0.38	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		566	627		554	627	131	698	593	193	697	
v/s Ratio Prot							0.00	0.36		c0.08	0.25	
v/s Ratio Perm		0.01	0.00		c0.37	0.12			0.00	c0.42		
v/c Ratio		0.02	0.00		0.95	0.31	0.01	0.96	0.01	1.12	0.65	
Uniform Delay, d1		22.0	21.8		35.0	24.9	51.4	36.3	23.3	51.6	30.7	
Progression Factor		1.00	1.00		1.00	1.00	0.83	0.58	1.00	1.00	1.00	
Incremental Delay, d2		0.0	0.0		25.2	0.3	0.0	16.4	0.0	100.4	4.7	
Delay (s)		22.0	21.8		60.2	25.2	42.8	37.4	23.3	152.0	35.4	
Level of Service		C	C		E	C	D	D	C	F	D	
Approach Delay (s)		22.0			46.4			37.0			73.1	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			51.4				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.0		
Intersection Capacity Utilization			85.9%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

AM 2037 B-MIT-L

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

Timing Plan: MIT

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Future Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	0		0			0		0
Storage Lanes		0		0	0		0			0		0
Taper Length (ft)		25			25					25		
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)			30			30					30	
Link Distance (ft)			283			639					1635	
Travel Time (s)			6.4			14.5					37.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%	2%	2%	4%	4%	4%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	206	0	0	45	0	0	0	0	451	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)			0			0					0	
Link Offset(ft)			0			0					0	
Crosswalk Width(ft)			16			16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60		60	60		60	60	60	60		60
Turn Type	Perm	Perm	NA		Perm	NA			Perm	Perm	NA	
Protected Phases			3			8					2	
Permitted Phases	3	3			8				2	2		
Detector Phase	3	3	3		8	8			2	2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0			5.0	5.0	5.0	
Minimum Split (s)	17.0	17.0	17.0		11.0	11.0			29.0	29.0	29.0	
Total Split (s)	50.0	50.0	50.0		11.0	11.0			34.0	34.0	34.0	
Total Split (%)	41.7%	41.7%	41.7%		9.2%	9.2%			28.3%	28.3%	28.3%	
Maximum Green (s)	44.0	44.0	44.0		5.0	5.0			28.0	28.0	28.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0	
Lost Time Adjust (s)			-2.0			-2.0					-2.0	
Total Lost Time (s)			4.0			4.0					4.0	
Lead/Lag	Lead	Lead	Lead		Lag	Lag						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0	3.0	
Recall Mode	None	None	None		None	None			C-Min	C-Min	C-Min	
Walk Time (s)	0.0	0.0	0.0						0.0	0.0	0.0	
Flash Dont Walk (s)	11.0	11.0	11.0						23.0	23.0	23.0	
Pedestrian Calls (#/hr)	2	2	2						3	3	3	
v/c Ratio			1.51			0.45					0.67	
Control Delay			292.0			62.1					40.2	
Queue Delay			0.0			0.0					4.5	
Total Delay			292.0			62.1					44.8	
Queue Length 50th (ft)			~220			29					275	

Lanes, Volumes, Timings
21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

AM 2037 B-MIT-L

Timing Plan: MIT

									
Lane Group	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Lane Configurations									
Traffic Volume (vph)	2	390	158	2	6	2	6		
Future Volume (vph)	2	390	158	2	6	2	6		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		200			0	0		
Storage Lanes	0		1			1	0		
Taper Length (ft)	25					25			
Right Turn on Red				Yes					
Link Speed (mph)		30				30			
Link Distance (ft)		501				271			
Travel Time (s)		11.4				6.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%		
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	435	178	0	0	16	0		
Enter Blocked Intersection	No	No	No	No	No	No	No		
Lane Alignment	Left	Left	Right	Right	Left	Left	Right		
Median Width(ft)		0				12			
Link Offset(ft)		0				0			
Crosswalk Width(ft)		16				16			
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	60		60	60	60	60	60		
Turn Type	Perm	NA	Perm		Perm	Perm			
Protected Phases		6						11	12
Permitted Phases	6		6		4	4			
Detector Phase	6	6	6		4	4			
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0		1.0	1.0
Minimum Split (s)	11.0	11.0	11.0		11.0	11.0		7.0	7.0
Total Split (s)	34.0	34.0	34.0		11.0	11.0		7.0	7.0
Total Split (%)	28.3%	28.3%	28.3%		9.2%	9.2%		6%	6%
Maximum Green (s)	28.0	28.0	28.0		5.0	5.0		5.0	5.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0		2.0	2.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0		0.0	0.0
Lost Time Adjust (s)		-2.0	-2.0			-2.0			
Total Lost Time (s)		4.0	4.0			4.0			
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Min	Min	Min		None	None		None	None
Walk Time (s)								5.0	5.0
Flash Dont Walk (s)								0.0	0.0
Pedestrian Calls (#/hr)								3	2
v/c Ratio		0.63	0.26			0.16			
Control Delay		27.4	5.5			57.6			
Queue Delay		1.2	0.0			0.0			
Total Delay		28.6	5.5			57.6			
Queue Length 50th (ft)		217	16			12			

Lanes, Volumes, Timings

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

AM 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Queue Length 95th (ft)			#392			69					#565	
Internal Link Dist (ft)			203			559					1555	
Turn Bay Length (ft)												
Base Capacity (vph)			136			101					673	
Starvation Cap Reductn			0			0					0	
Spillback Cap Reductn			0			0					153	
Storage Cap Reductn			0			0					0	
Reduced v/c Ratio			1.51			0.45					0.87	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

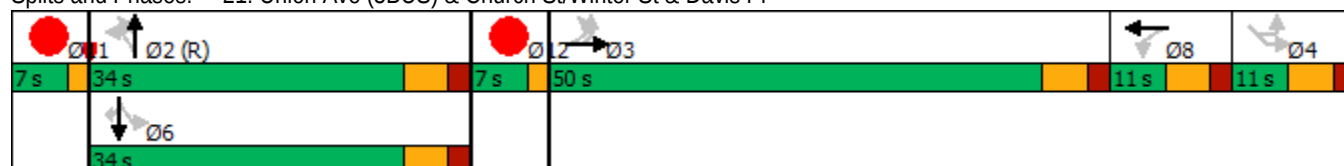
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl



									
Lane Group	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Queue Length 95th (ft)		m#441	m48			36			
Internal Link Dist (ft)		421				191			
Turn Bay Length (ft)			200						
Base Capacity (vph)		687	694			100			
Starvation Cap Reductn		98	0			0			
Spillback Cap Reductn		0	0			0			
Storage Cap Reductn		0	0			0			
Reduced v/c Ratio		0.74	0.26			0.16			
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

AM 2037 B-MIT-L

Timing Plan: MIT

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Future Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0					4.0	
Lane Util. Factor			1.00			1.00					1.00	
Frt			0.99			0.97					1.00	
Flt Protected			0.96			0.99					1.00	
Satd. Flow (prot)			1756			1793					1824	
Flt Permitted			0.17			0.90					1.00	
Satd. Flow (perm)			316			1627					1822	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91
Adj. Flow (vph)	6	179	13	8	7	28	2	8	1	1	445	4
RTOR Reduction (vph)	0	0	1	0	0	7	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	205	0	0	38	0	0	0	0	451	0
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%	2%	2%	4%	4%	4%	4%
Turn Type	Perm	Perm	NA		Perm	NA			Perm	Perm	NA	
Protected Phases			3			8					2	
Permitted Phases	3	3			8				2	2		
Actuated Green, G (s)			49.6			4.0					34.4	
Effective Green, g (s)			51.6			6.0					36.4	
Actuated g/C Ratio			0.43			0.05					0.30	
Clearance Time (s)			6.0			6.0					6.0	
Vehicle Extension (s)			3.0			3.0					3.0	
Lane Grp Cap (vph)			135			81					552	
v/s Ratio Prot												
v/s Ratio Perm			c0.65			c0.02					c0.25	
v/c Ratio			1.52			0.47					0.82	
Uniform Delay, d1			34.2			55.5					38.7	
Progression Factor			1.00			1.00					1.00	
Incremental Delay, d2			267.0			4.3					12.6	
Delay (s)			301.2			59.8					51.3	
Level of Service			F			E					D	
Approach Delay (s)			301.2			59.8					51.3	
Approach LOS			F			E					D	
Intersection Summary												
HCM 2000 Control Delay			80.2			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.14									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			22.0			
Intersection Capacity Utilization			58.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

AM 2037 B-MIT-L

Timing Plan: MIT

							
Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER
Lane Configurations							
Traffic Volume (vph)	2	390	158	2	6	2	6
Future Volume (vph)	2	390	158	2	6	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	
Lane Util. Factor		1.00	1.00			1.00	
Frt		1.00	0.85			0.94	
Flt Protected		1.00	1.00			0.97	
Satd. Flow (prot)		1862	1583			1705	
Flt Permitted		1.00	1.00			0.97	
Satd. Flow (perm)		1860	1583			1705	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	433	176	2	7	2	7
RTOR Reduction (vph)	0	0	121	0	0	0	0
Lane Group Flow (vph)	0	435	57	0	0	16	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm		Perm	Perm	
Protected Phases		6					
Permitted Phases	6		6		4	4	
Actuated Green, G (s)		34.4	34.4			2.0	
Effective Green, g (s)		36.4	36.4			4.0	
Actuated g/C Ratio		0.30	0.30			0.03	
Clearance Time (s)		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0			3.0	
Lane Grp Cap (vph)		564	480			56	
v/s Ratio Prot							
v/s Ratio Perm		0.23	0.04			c0.01	
v/c Ratio		0.77	0.12			0.29	
Uniform Delay, d1		38.0	30.2			56.6	
Progression Factor		0.69	0.90			1.00	
Incremental Delay, d2		3.9	0.1			2.8	
Delay (s)		30.1	27.2			59.4	
Level of Service		C	C			E	
Approach Delay (s)		29.3				59.4	
Approach LOS		C				E	
Intersection Summary							

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Future Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		25	0		175	150		150	100		75
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			175			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			600			501			6259	
Travel Time (s)		4.5			13.6			11.4			142.3	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	25	1	0	337	332	1	739	420	283	727	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			20			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3		3	3		3			2	2		
Detector Phase	3	3	3	3	3	3	1	2	2	1	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	11.0	31.0	31.0	11.0	31.0	
Total Split (s)	34.0	34.0	34.0	34.0	34.0	34.0	20.0	52.0	52.0	20.0	52.0	
Total Split (%)	28.3%	28.3%	28.3%	28.3%	28.3%	28.3%	16.7%	43.3%	43.3%	16.7%	43.3%	
Maximum Green (s)	28.0	28.0	28.0	28.0	28.0	28.0	14.0	46.0	46.0	14.0	46.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Flash Dont Walk (s)	25.0	25.0	25.0	25.0	25.0	25.0		15.0	15.0		15.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0		5	5		5	
v/c Ratio		0.05	0.00		0.81	0.47	0.00	0.88	0.51	0.94	0.87	
Control Delay		29.5	0.0		55.4	6.6	43.0	25.2	7.9	80.9	42.9	
Queue Delay		0.0	0.0		0.0	0.0	0.0	18.2	0.5	0.0	10.5	
Total Delay		29.5	0.0		55.4	6.6	43.0	43.4	8.4	80.9	53.3	
Queue Length 50th (ft)		14	0		241	9	1	285	66	163	486	

Lanes, Volumes, Timings
 18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-L

Timing Plan: MIT

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	0
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		35	0		#395	79	m2	m278	m62	#347	#804	
Internal Link Dist (ft)		120			520			421			6179	
Turn Bay Length (ft)			25			175	150		150	100		
Base Capacity (vph)		554	569		414	710	238	840	824	302	838	
Starvation Cap Reductn		0	0		0	0	0	113	130	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	98	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.05	0.00		0.81	0.47	0.00	1.02	0.61	0.94	0.98	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 114 (95%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 100

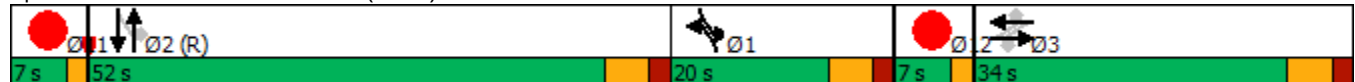
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 18: Union Ave (3BUS) & Rite Aid/Gilford Ave



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)		
------------------------	--	--

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-L

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Future Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1852	1583		1794	1599	1787	1881	1599	1787	1877	
Flt Permitted		0.97	1.00		0.71	1.00	0.95	1.00	1.00	0.08	1.00	
Satd. Flow (perm)		1799	1583		1342	1599	1787	1881	1599	145	1877	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.95	0.95	0.95
Adj. Flow (vph)	3	22	1	328	9	332	1	739	420	283	716	11
RTOR Reduction (vph)	0	0	1	0	0	218	0	0	113	0	1	0
Lane Group Flow (vph)	0	25	0	0	337	114	1	739	307	283	726	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3		3	3		3			2	2		
Actuated Green, G (s)		35.0	35.0		35.0	35.0	14.0	50.0	50.0	64.0	50.0	
Effective Green, g (s)		37.0	37.0		37.0	37.0	16.0	52.0	52.0	68.0	52.0	
Actuated g/C Ratio		0.31	0.31		0.31	0.31	0.13	0.43	0.43	0.57	0.43	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		554	488		413	493	238	815	692	301	813	
v/s Ratio Prot							0.00	0.39		0.13	0.39	
v/s Ratio Perm		0.01	0.00		0.25	0.07			0.19	0.41		
v/c Ratio		0.05	0.00		0.82	0.23	0.00	0.91	0.44	0.94	0.89	
Uniform Delay, d1		29.1	28.7		38.4	30.9	45.1	31.7	23.9	46.1	31.4	
Progression Factor		1.00	1.00		1.00	1.00	0.96	0.73	0.62	1.00	1.00	
Incremental Delay, d2		0.0	0.0		11.8	0.2	0.0	1.9	0.2	36.2	14.3	
Delay (s)		29.1	28.7		50.1	31.2	43.2	25.2	14.9	82.3	45.7	
Level of Service		C	C		D	C	D	C	B	F	D	
Approach Delay (s)		29.1			40.7			21.5			56.0	
Approach LOS		C			D			C			E	
Intersection Summary												
HCM 2000 Control Delay			38.2									
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			87.2%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

PM 2037 B-MIT-L

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

Timing Plan: MIT

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Future Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	0		0				0	0
Storage Lanes		0		0	0		0				0	0
Taper Length (ft)		25			25							25
Right Turn on Red				Yes				Yes			Yes	
Link Speed (mph)			30			30				30		
Link Distance (ft)			283			639				1635		
Travel Time (s)			6.4			14.5				37.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	381	0	0	68	0	0	0	613	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Left
Median Width(ft)			0			0				0		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60	60		9	15		60	60	60		60	60
Turn Type	Perm	Perm	NA		Perm	NA			Perm	NA		Perm
Protected Phases			3			8				2		
Permitted Phases	3	3			8				2			6
Detector Phase	3	3	3		8	8			2	2		6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0			10.0	10.0		10.0
Minimum Split (s)	17.0	17.0	17.0		11.0	11.0			29.0	29.0		16.0
Total Split (s)	47.0	47.0	47.0		11.0	11.0			37.0	37.0		37.0
Total Split (%)	39.2%	39.2%	39.2%		9.2%	9.2%			30.8%	30.8%		30.8%
Maximum Green (s)	41.0	41.0	41.0		5.0	5.0			31.0	31.0		31.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lost Time Adjust (s)			-2.0			-2.0				-2.0		
Total Lost Time (s)			4.0			4.0				4.0		
Lead/Lag	Lead	Lead	Lead		Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0		3.0
Recall Mode	None	None	None		None	None			C-Min	C-Min		Min
Walk Time (s)	0.0	0.0	0.0						0.0	0.0		
Flash Dont Walk (s)	11.0	11.0	11.0						23.0	23.0		
Pedestrian Calls (#/hr)	5	5	5						10	10		
v/c Ratio			2.27			0.72				0.89		
Control Delay			609.6			85.1				53.2		
Queue Delay			0.0			0.0				8.2		
Total Delay			609.6			85.1				61.4		
Queue Length 50th (ft)			~480			45				~473		

Lanes, Volumes, Timings
21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

PM 2037 B-MIT-L

Timing Plan: MIT

									
Lane Group	SBT	SBR	SBR2	SEL2	SEL	SER	SER2	Ø11	Ø12
Lane Configurations									
Traffic Volume (vph)	506	223	2	6	4	9	8		
Future Volume (vph)	506	223	2	6	4	9	8		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)		200			0	0			
Storage Lanes		1			1	0			
Taper Length (ft)					25				
Right Turn on Red			Yes				Yes		
Link Speed (mph)	30				30				
Link Distance (ft)	501				271				
Travel Time (s)	11.4				6.2				
Peak Hour Factor	0.97	0.97	0.97	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%		
Shared Lane Traffic (%)									
Lane Group Flow (vph)	526	232	0	0	30	0	0		
Enter Blocked Intersection	No	No	No	No	No	No	No		
Lane Alignment	Left	Right	Right	Left	Left	Right	Right		
Median Width(ft)	0				12				
Link Offset(ft)	0				0				
Crosswalk Width(ft)	16				16				
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)		60	60	60	60	60	60		
Turn Type	NA	Perm		Perm	Prot				
Protected Phases	6				4			11	12
Permitted Phases		6		4					
Detector Phase	6	6		4	4				
Switch Phase									
Minimum Initial (s)	10.0	10.0		5.0	5.0			1.0	1.0
Minimum Split (s)	16.0	16.0		11.0	11.0			7.0	7.0
Total Split (s)	37.0	37.0		11.0	11.0			7.0	7.0
Total Split (%)	30.8%	30.8%		9.2%	9.2%			6%	6%
Maximum Green (s)	31.0	31.0		5.0	5.0			5.0	5.0
Yellow Time (s)	4.0	4.0		4.0	4.0			2.0	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0			0.0	0.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0				
Total Lost Time (s)	4.0	4.0			4.0				
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0
Recall Mode	Min	Min		None	None			None	None
Walk Time (s)								5.0	5.0
Flash Dont Walk (s)								0.0	0.0
Pedestrian Calls (#/hr)								10	5
v/c Ratio	0.75	0.33			0.11				
Control Delay	30.5	7.2			0.9				
Queue Delay	1.2	0.0			0.0				
Total Delay	31.6	7.2			0.9				
Queue Length 50th (ft)	282	19			0				

Lanes, Volumes, Timings

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

PM 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL
Queue Length 95th (ft)			#584			#123				#810		
Internal Link Dist (ft)			203			559				1555		
Turn Bay Length (ft)												
Base Capacity (vph)			168			95				691		
Starvation Cap Reductn			0			0				0		
Spillback Cap Reductn			0			0				59		
Storage Cap Reductn			0			0				0		
Reduced v/c Ratio			2.27			0.72				0.97		

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

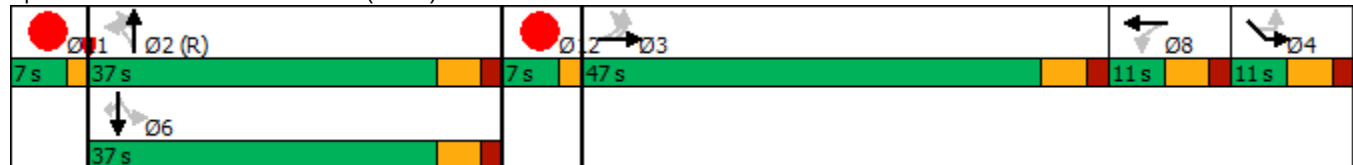
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl



									
Lane Group	SBT	SBR	SBR2	SEL2	SEL	SER	SER2	Ø11	Ø12
Queue Length 95th (ft)	m#576	m38			0				
Internal Link Dist (ft)	421				191				
Turn Bay Length (ft)		200							
Base Capacity (vph)	705	710			261				
Starvation Cap Reductn	54	0			0				
Spillback Cap Reductn	0	0			0				
Storage Cap Reductn	0	0			0				
Reduced v/c Ratio	0.81	0.33			0.11				
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

PM 2037 B-MIT-L

Timing Plan: MIT

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Future Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			4.0			4.0				4.0		
Lane Util. Factor			1.00			1.00				1.00		
Frt			1.00			0.96				1.00		
Flt Protected			0.96			0.99				1.00		
Satd. Flow (prot)			1779			1771				1872		
Flt Permitted			0.22			0.82				0.98		
Satd. Flow (perm)			415			1473				1832		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97
Adj. Flow (vph)	7	338	31	5	14	34	4	16	1	590	22	4
RTOR Reduction (vph)	0	0	1	0	0	10	0	0	0	1	0	0
Lane Group Flow (vph)	0	0	380	0	0	59	0	0	0	612	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA		Perm	NA			Perm	NA		Perm
Protected Phases			3			8				2		
Permitted Phases	3	3			8				2			6
Actuated Green, G (s)			46.6			4.0				36.4		
Effective Green, g (s)			48.6			6.0				38.4		
Actuated g/C Ratio			0.41			0.05				0.32		
Clearance Time (s)			6.0			6.0				6.0		
Vehicle Extension (s)			3.0			3.0				3.0		
Lane Grp Cap (vph)			168			73				586		
v/s Ratio Prot												
v/s Ratio Perm			c0.92			c0.04				c0.33		
v/c Ratio			2.26			0.80				1.04		
Uniform Delay, d1			35.7			56.4				40.8		
Progression Factor			1.00			1.00				1.00		
Incremental Delay, d2			587.5			45.0				49.1		
Delay (s)			623.2			101.4				89.9		
Level of Service			F			F				F		
Approach Delay (s)			623.2			101.4				89.9		
Approach LOS			F			F				F		
Intersection Summary												
HCM 2000 Control Delay			175.5									
HCM 2000 Volume to Capacity ratio			1.55									
Actuated Cycle Length (s)			120.0							20.0		
Intersection Capacity Utilization			79.0%							D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

PM 2037 B-MIT-L

Timing Plan: MIT

							
Movement	SBT	SBR	SBR2	SEL2	SEL	SER	SER2
Lane Configurations							
Traffic Volume (vph)	506	223	2	6	4	9	8
Future Volume (vph)	506	223	2	6	4	9	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		
Lane Util. Factor	1.00	1.00			1.00		
Frt	1.00	0.85			0.91		
Flt Protected	1.00	1.00			0.98		
Satd. Flow (prot)	1880	1599			1673		
Flt Permitted	1.00	1.00			0.98		
Satd. Flow (perm)	1874	1599			1673		
Peak-hour factor, PHF	0.97	0.97	0.97	0.90	0.90	0.90	0.90
Adj. Flow (vph)	522	230	2	7	4	10	9
RTOR Reduction (vph)	0	118	0	0	29	0	0
Lane Group Flow (vph)	526	114	0	0	1	0	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%
Turn Type	NA	Perm		Perm	Prot		
Protected Phases	6				4		
Permitted Phases		6		4			
Actuated Green, G (s)	36.4	36.4			3.0		
Effective Green, g (s)	38.4	38.4			5.0		
Actuated g/C Ratio	0.32	0.32			0.04		
Clearance Time (s)	6.0	6.0			6.0		
Vehicle Extension (s)	3.0	3.0			3.0		
Lane Grp Cap (vph)	599	511			69		
v/s Ratio Prot							
v/s Ratio Perm	0.28	0.07			0.00		
v/c Ratio	0.88	0.22			0.02		
Uniform Delay, d1	38.6	29.9			55.1		
Progression Factor	0.72	0.70			1.00		
Incremental Delay, d2	7.5	0.1			0.1		
Delay (s)	35.5	21.1			55.3		
Level of Service	D	C			E		
Approach Delay (s)	31.1				55.3		
Approach LOS	C				E		
Intersection Summary							

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

SAT 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Future Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		25	0		175	150		150	100		75
Storage Lanes	0		1	0		1	1		1	1		0
Taper Length (ft)	25			25			175			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			600			501			6259	
Travel Time (s)		4.5			13.6			11.4			142.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	4	0	265	251	3	807	269	192	685	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			20			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60		60	60		60
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3		3	3		3			2	2		
Detector Phase	3	3	3	3	3	3	1	2	2	1	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	11.0	21.0	21.0	11.0	21.0	
Total Split (s)	31.0	31.0	31.0	31.0	31.0	31.0	13.0	62.0	62.0	13.0	62.0	
Total Split (%)	25.8%	25.8%	25.8%	25.8%	25.8%	25.8%	10.8%	51.7%	51.7%	10.8%	51.7%	
Maximum Green (s)	25.0	25.0	25.0	25.0	25.0	25.0	7.0	56.0	56.0	7.0	56.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag							Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	C-Min	C-Min	None	C-Min	
Walk Time (s)	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	
Flash Dont Walk (s)	25.0	25.0	25.0	25.0	25.0	25.0		15.0	15.0		15.0	
Pedestrian Calls (#/hr)	2	2	2	2	2	2		3	3		3	
v/c Ratio		0.05	0.01		0.81	0.43	0.02	0.79	0.29	0.72	0.67	
Control Delay		34.5	0.0		61.7	7.0	42.7	22.7	6.6	46.6	24.5	
Queue Delay		0.0	0.0		0.0	0.0	0.0	1.5	0.0	0.0	0.3	
Total Delay		34.5	0.0		61.7	7.0	42.7	24.1	6.6	46.6	24.8	
Queue Length 50th (ft)		11	0		184	0	3	282	27	54	367	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turning Speed (mph)		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	3	2
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

SAT 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		33	0		#355	68	m5	m427	m90	#186	576	
Internal Link Dist (ft)		120			520			421			6179	
Turn Bay Length (ft)			25			175	150		150	100		
Base Capacity (vph)		394	487		337	586	153	1025	933	268	1025	
Starvation Cap Reductn		0	0		0	0	0	87	0	0	0	
Spillback Cap Reductn		0	0		0	0	0	0	0	0	57	
Storage Cap Reductn		0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio		0.05	0.01		0.79	0.43	0.02	0.86	0.29	0.72	0.71	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 108 (90%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 100

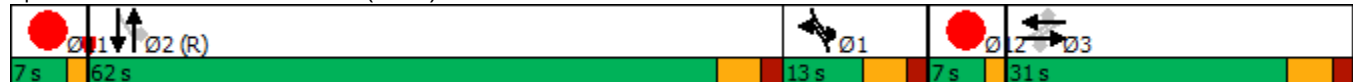
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 18: Union Ave (3BUS) & Rite Aid/Gilford Ave



Lane Group	Ø11	Ø12
------------	-----	-----

Queue Length 95th (ft)

Internal Link Dist (ft)

Turn Bay Length (ft)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Intersection Summary

HCM Signalized Intersection Capacity Analysis

18: Union Ave (3BUS) & Rite Aid/Gilford Ave

SAT 2037 B-MIT-L

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Future Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.97	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1815	1583		1777	1583	1787	1881	1599	1787	1879	
Flt Permitted		0.84	1.00		0.72	1.00	0.95	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		1566	1583		1340	1583	1787	1881	1599	210	1879	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	9	4	256	9	251	3	807	269	192	679	6
RTOR Reduction (vph)	0	0	3	0	0	189	0	0	65	0	0	0
Lane Group Flow (vph)	0	19	1	0	265	62	3	807	204	192	685	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	NA	Perm	pm+pt	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3		3	3		3			2	2		
Actuated Green, G (s)		27.5	27.5		27.5	27.5	8.3	60.2	60.2	68.5	60.2	
Effective Green, g (s)		29.5	29.5		29.5	29.5	10.3	62.2	62.2	72.5	62.2	
Actuated g/C Ratio		0.25	0.25		0.25	0.25	0.09	0.52	0.52	0.60	0.52	
Clearance Time (s)		6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		384	389		329	389	153	974	828	262	973	
v/s Ratio Prot							0.00	c0.43		c0.06	0.36	
v/s Ratio Perm		0.01	0.00		c0.20	0.04			0.13	0.38		
v/c Ratio		0.05	0.00		0.81	0.16	0.02	0.83	0.25	0.73	0.70	
Uniform Delay, d1		34.5	34.1		42.6	35.5	50.2	24.4	16.0	42.3	21.9	
Progression Factor		1.00	1.00		1.00	1.00	0.83	0.73	0.77	1.00	1.00	
Incremental Delay, d2		0.1	0.0		13.4	0.2	0.0	6.7	0.6	10.1	4.3	
Delay (s)		34.6	34.1		55.9	35.7	41.5	24.5	12.8	52.4	26.2	
Level of Service		C	C		E	D	D	C	B	D	C	
Approach Delay (s)		34.5			46.1			21.7			31.9	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			30.4									
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			120.0									
Intersection Capacity Utilization			77.6%									
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

SAT 2037 B-MIT-L

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Future Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0				0		0	0	
Storage Lanes	0		0	0				0		0	0	
Taper Length (ft)	25			25				25			25	
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		30			30				30			30
Link Distance (ft)		283			639				1635			501
Travel Time (s)		6.4			14.5				37.2			11.4
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	274	0	0	31	0	0	0	575	0	0	477
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Left	Right	Left	Left
Median Width(ft)		0			0				0			0
Link Offset(ft)		0			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60		60	60		60	60	60		60	60	
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		3			8				2			6
Permitted Phases	3			8			2	2			6	
Detector Phase	3	3		8	8		2	2	2		6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0		5.0	5.0
Minimum Split (s)	17.0	17.0		11.0	11.0		29.0	29.0	29.0		11.0	11.0
Total Split (s)	42.0	42.0		11.0	11.0		42.0	42.0	42.0		42.0	42.0
Total Split (%)	35.0%	35.0%		9.2%	9.2%		35.0%	35.0%	35.0%		35.0%	35.0%
Maximum Green (s)	36.0	36.0		5.0	5.0		36.0	36.0	36.0		36.0	36.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0				-2.0			-2.0
Total Lost Time (s)		4.0			4.0				4.0			4.0
Lead/Lag	Lead	Lead		Lag	Lag							
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min	C-Min		Min	Min
Walk Time (s)	0.0	0.0					0.0	0.0	0.0			
Flash Dont Walk (s)	11.0	11.0					23.0	23.0	23.0			
Pedestrian Calls (#/hr)	4	4					6	6	6			
v/c Ratio		1.13			0.13				0.66			0.54
Control Delay		132.6			1.1				31.3			18.3
Queue Delay		0.3			0.0				0.0			0.6
Total Delay		133.0			1.1				31.3			18.9
Queue Length 50th (ft)		~239			0				336			167

Lanes, Volumes, Timings
21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

SAT 2037 B-MIT-L

Timing Plan: MIT

							
Lane Group	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Lane Configurations							
Traffic Volume (vph)	139	2	2	0	1		
Future Volume (vph)	139	2	2	0	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900		
Storage Length (ft)	200			0	0		
Storage Lanes	1			1	0		
Taper Length (ft)				25			
Right Turn on Red		Yes					
Link Speed (mph)				30			
Link Distance (ft)				271			
Travel Time (s)				6.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	1%	1%	2%	2%	2%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	156	0	0	3	0		
Enter Blocked Intersection	No	No	No	No	No		
Lane Alignment	Right	Right	Left	Left	Right		
Median Width(ft)				12			
Link Offset(ft)				0			
Crosswalk Width(ft)				16			
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00		
Turning Speed (mph)	60	60	60	60	60		
Turn Type	Perm		Perm	Prot			
Protected Phases				4		11	12
Permitted Phases	6		4				
Detector Phase	6		4	4			
Switch Phase							
Minimum Initial (s)	5.0		5.0	5.0		1.0	1.0
Minimum Split (s)	11.0		11.0	11.0		7.0	7.0
Total Split (s)	42.0		11.0	11.0		7.0	7.0
Total Split (%)	35.0%		9.2%	9.2%		6%	6%
Maximum Green (s)	36.0		5.0	5.0		5.0	5.0
Yellow Time (s)	4.0		4.0	4.0		2.0	2.0
All-Red Time (s)	2.0		2.0	2.0		0.0	0.0
Lost Time Adjust (s)	-2.0			-2.0			
Total Lost Time (s)	4.0			4.0			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0
Recall Mode	Min		None	None		None	None
Walk Time (s)						5.0	5.0
Flash Dont Walk (s)						0.0	0.0
Pedestrian Calls (#/hr)						6	4
v/c Ratio	0.18			0.03			
Control Delay	2.0			54.0			
Queue Delay	0.0			0.0			
Total Delay	2.0			54.0			
Queue Length 50th (ft)	5			2			

Lanes, Volumes, Timings

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

SAT 2037 B-MIT-L

Timing Plan: MIT

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Queue Length 95th (ft)		#447			0				#676			#494
Internal Link Dist (ft)		203			559				1555			421
Turn Bay Length (ft)												
Base Capacity (vph)		243			245				874			883
Starvation Cap Reductn		0			0				0			146
Spillback Cap Reductn		6			0				0			0
Storage Cap Reductn		0			0				0			0
Reduced v/c Ratio		1.16			0.13				0.66			0.65

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 8 (7%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

~ 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.

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

Splits and Phases: 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

							
Ø1	Ø2 (R)		Ø2	Ø3		Ø8	Ø4
7 s	42 s		7 s	42 s		11 s	11 s
		Ø6					
	42 s						

							
Lane Group	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Queue Length 95th (ft)	m16			13			
Internal Link Dist (ft)				191			
Turn Bay Length (ft)	200						
Base Capacity (vph)	848			103			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.18			0.03			
Intersection Summary							

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

SAT 2037 B-MIT-L

Timing Plan: MIT

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Future Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0				4.0			4.0
Lane Util. Factor		1.00			1.00				1.00			1.00
Frt		1.00			0.97				1.00			1.00
Flt Protected		0.96			0.98				1.00			1.00
Satd. Flow (prot)		1780			1777				1860			1880
Flt Permitted		0.36			0.79				0.99			0.99
Satd. Flow (perm)		668			1424				1847			1868
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.90	0.90
Adj. Flow (vph)	232	34	8	10	14	7	7	1	563	4	6	471
RTOR Reduction (vph)	0	1	0	0	30	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	273	0	0	1	0	0	0	575	0	0	477
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		3			8				2			6
Permitted Phases	3			8			2	2			6	
Actuated Green, G (s)		41.6			3.0				44.4			44.4
Effective Green, g (s)		43.6			5.0				46.4			46.4
Actuated g/C Ratio		0.36			0.04				0.39			0.39
Clearance Time (s)		6.0			6.0				6.0			6.0
Vehicle Extension (s)		3.0			3.0				3.0			3.0
Lane Grp Cap (vph)		242			59				714			722
v/s Ratio Prot												
v/s Ratio Perm		c0.41			c0.00				c0.31			0.26
v/c Ratio		1.13			0.02				0.81			0.66
Uniform Delay, d1		38.2			55.2				32.8			30.3
Progression Factor		1.00			1.00				1.00			0.63
Incremental Delay, d2		97.2			0.2				9.4			1.6
Delay (s)		135.4			55.3				42.2			20.8
Level of Service		F			E				D			C
Approach Delay (s)		135.4			55.3				42.2			18.8
Approach LOS		F			E				D			B
Intersection Summary												
HCM 2000 Control Delay			49.6		HCM 2000 Level of Service				D			
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)				20.0			
Intersection Capacity Utilization			67.3%		ICU Level of Service				C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

SAT 2037 B-MIT-L

Timing Plan: MIT

					
Movement	SBR	SBR2	SEL2	SEL	SER
Lane Configurations					
Traffic Volume (vph)	139	2	2	0	1
Future Volume (vph)	139	2	2	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	
Lane Util. Factor	1.00			1.00	
Frt	0.85			0.95	
Flt Protected	1.00			0.97	
Satd. Flow (prot)	1599			1722	
Flt Permitted	1.00			0.97	
Satd. Flow (perm)	1599			1722	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	2	2	0	1
RTOR Reduction (vph)	96	0	0	0	0
Lane Group Flow (vph)	60	0	0	3	0
Heavy Vehicles (%)	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Prot	
Protected Phases				4	
Permitted Phases	6		4		
Actuated Green, G (s)	44.4			1.0	
Effective Green, g (s)	46.4			3.0	
Actuated g/C Ratio	0.39			0.02	
Clearance Time (s)	6.0			6.0	
Vehicle Extension (s)	3.0			3.0	
Lane Grp Cap (vph)	618			43	
v/s Ratio Prot					
v/s Ratio Perm	0.04			0.00	
v/c Ratio	0.10			0.07	
Uniform Delay, d1	23.5			57.1	
Progression Factor	0.55			1.00	
Incremental Delay, d2	0.0			0.7	
Delay (s)	12.9			57.8	
Level of Service	B			E	
Approach Delay (s)				57.8	
Approach LOS				E	
Intersection Summary					

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

AM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Future Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		25	0		175	150		150	100		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			175			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			600			528			5415	
Travel Time (s)		4.5			13.6			12.0			123.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	9	3	0	524	340	0	1	688	0	216	453	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			20			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3			3								
Detector Phase	3	3		3	3		1	2		1	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	31.0		11.0	31.0	
Total Split (s)	37.0	37.0		37.0	37.0		17.0	31.0		17.0	31.0	
Total Split (%)	37.0%	37.0%		37.0%	37.0%		17.0%	31.0%		17.0%	31.0%	
Maximum Green (s)	31.0	31.0		31.0	31.0		11.0	25.0		11.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Walk Time (s)								0.0			0.0	
Flash Dont Walk (s)								15.0			15.0	
Pedestrian Calls (#/hr)								5			5	
v/c Ratio	0.03	0.00		0.91	0.35		0.00	0.62		0.89	0.41	
Control Delay	18.1	15.7		49.5	1.0		33.0	27.4		78.6	28.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	18.1	15.7		49.5	1.0		33.0	27.4		78.6	28.5	
Queue Length 50th (ft)	3	1		307	0		0	212		139	114	
Queue Length 95th (ft)	14	6		#515	0		m1	207		#282	176	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	8.0
Total Split (%)	7%	8%
Maximum Green (s)	5.0	6.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	0
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			520			448			5335	
Turn Bay Length (ft)							150			100		
Base Capacity (vph)	325	728		578	963		244	1102		244	1104	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.03	0.00		0.91	0.35		0.00	0.62		0.89	0.41	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 18 (18%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 18: Union Ave (3BUS) & Rite Aid/Gilford Ave



Lane Group	Ø11	Ø12
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		
Intersection Summary		

HCM Signalized Intersection Capacity Analysis

18: Union Ave (3BUS) & Rite Aid/Gilford Ave

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Future Volume (vph)	8	2	1	472	0	306	1	615	18	194	407	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.85		1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1770		1770	1583		1752	3490		1752	3504	
Flt Permitted	0.42	1.00		0.76	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	791	1770		1408	1583		1752	3490		1752	3504	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.92	0.92	0.92	0.90	0.90	0.90
Adj. Flow (vph)	9	2	1	524	0	340	1	668	20	216	452	1
RTOR Reduction (vph)	0	1	0	0	200	0	0	2	0	0	0	0
Lane Group Flow (vph)	9	2	0	524	140	0	1	686	0	216	453	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	3%	3%	3%	3%	3%	3%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3			3								
Actuated Green, G (s)	39.1	39.1		39.1	39.1		12.0	27.9		12.0	27.9	
Effective Green, g (s)	41.1	41.1		41.1	41.1		14.0	29.9		14.0	29.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41		0.14	0.30		0.14	0.30	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	727		578	650		245	1043		245	1047	
v/s Ratio Prot		0.00			0.09		0.00	c0.20		c0.12	0.13	
v/s Ratio Perm	0.01			c0.37								
v/c Ratio	0.03	0.00		0.91	0.21		0.00	0.66		0.88	0.43	
Uniform Delay, d1	17.5	17.4		27.6	19.0		37.0	30.6		42.2	28.2	
Progression Factor	1.00	1.00		1.00	1.00		0.88	0.84		1.00	1.00	
Incremental Delay, d2	0.0	0.0		17.8	0.2		0.0	3.0		28.7	1.3	
Delay (s)	17.6	17.4		45.5	19.2		32.5	28.7		70.9	29.5	
Level of Service	B	B		D	B		C	C		E	C	
Approach Delay (s)		17.5			35.1			28.7			42.9	
Approach LOS		B			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			35.4			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			71.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

AM 2037 B-MIT-Non Constrained_r1

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

Timing Plan: OPTIMIZE

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Future Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	0		0			0		0
Storage Lanes		1		0	0		0			0		0
Taper Length (ft)		25			25					25		
Right Turn on Red				Yes				Yes				Yes
Link Speed (mph)			30			30					30	
Link Distance (ft)			283			639					1635	
Travel Time (s)			6.4			14.5					37.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%	2%	2%	4%	4%	4%	4%
Shared Lane Traffic (%)		46%										
Lane Group Flow (vph)	0	103	103	0	0	45	0	0	0	0	451	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Left	Right
Median Width(ft)			12			12					0	
Link Offset(ft)			0			0					0	
Crosswalk Width(ft)			16			16					16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	Perm	NA		Perm	NA			Perm	Perm	NA	
Protected Phases			3			8					2	
Permitted Phases	3	3			8				2	2		
Detector Phase	3	3	3		8	8			2	2	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0			10.0	10.0	10.0	
Minimum Split (s)	17.0	17.0	17.0		11.0	11.0			29.0	29.0	29.0	
Total Split (s)	17.0	17.0	17.0		17.0	17.0			41.0	41.0	41.0	
Total Split (%)	17.0%	17.0%	17.0%		17.0%	17.0%			41.0%	41.0%	41.0%	
Maximum Green (s)	11.0	11.0	11.0		11.0	11.0			35.0	35.0	35.0	
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0			-2.0					-2.0	
Total Lost Time (s)		4.0	4.0			4.0					4.0	
Lead/Lag	Lag	Lag	Lag		Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0	3.0	
Recall Mode	None	None	None		None	None			C-Min	C-Min	C-Min	
Walk Time (s)	0.0	0.0	0.0						0.0	0.0	0.0	
Flash Dont Walk (s)	11.0	11.0	11.0						23.0	23.0	23.0	
Pedestrian Calls (#/hr)	5	5	5						10	10	10	
v/c Ratio		0.58	0.57			0.64					0.44	
Control Delay		53.9	51.8			74.4					19.2	
Queue Delay		0.0	0.0			0.0					0.0	
Total Delay		53.9	51.8			74.4					19.2	
Queue Length 50th (ft)		64	62			22					151	
Queue Length 95th (ft)		#140	#136			#82					349	

									
Lane Group	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Lane Configurations									
Traffic Volume (vph)	2	390	158	2	6	2	6		
Future Volume (vph)	2	390	158	2	6	2	6		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)	0		200			0	0		
Storage Lanes	0		0			1	0		
Taper Length (ft)	25					25			
Right Turn on Red				Yes					
Link Speed (mph)		30				30			
Link Distance (ft)		528				271			
Travel Time (s)		12.0				6.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%		
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	435	178	0	0	16	0		
Enter Blocked Intersection	No	No	No	No	No	No	No		
Lane Alignment	Left	Left	Right	Right	Left	Left	Right		
Median Width(ft)		0				12			
Link Offset(ft)		0				0			
Crosswalk Width(ft)		16				16			
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Turn Type	Perm	NA	Perm		Perm	Prot			
Protected Phases		6				4		11	12
Permitted Phases	6		6		4				
Detector Phase	6	6	6		4	4			
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0		5.0	5.0		1.0	1.0
Minimum Split (s)	16.0	16.0	16.0		11.0	11.0		7.0	7.0
Total Split (s)	41.0	41.0	41.0		11.0	11.0		7.0	7.0
Total Split (%)	41.0%	41.0%	41.0%		11.0%	11.0%		7%	7%
Maximum Green (s)	35.0	35.0	35.0		5.0	5.0		5.0	5.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0		2.0	2.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0		0.0	0.0
Lost Time Adjust (s)		-2.0	-2.0			-2.0			
Total Lost Time (s)		4.0	4.0			4.0			
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0		3.0	3.0
Recall Mode	Min	Min	Min		None	None		None	None
Walk Time (s)								5.0	5.0
Flash Dont Walk (s)								0.0	0.0
Pedestrian Calls (#/hr)								10	5
v/c Ratio		0.42	0.18			0.12			
Control Delay		11.0	1.8			45.8			
Queue Delay		0.3	0.0			0.0			
Total Delay		11.3	1.8			45.8			
Queue Length 50th (ft)		54	0			10			
Queue Length 95th (ft)		m221	m18			31			

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Internal Link Dist (ft)			203			559					1555	
Turn Bay Length (ft)												
Base Capacity (vph)		186	189			77					1025	
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		0.55	0.54			0.58					0.44	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 85

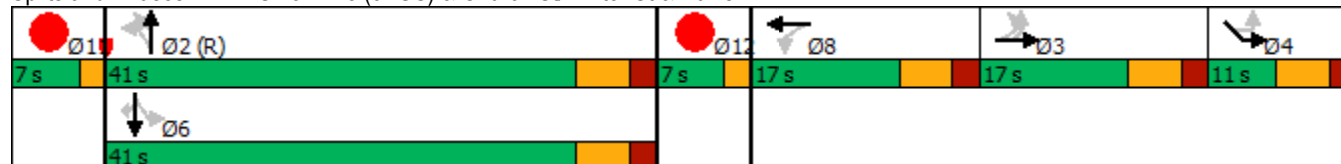
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl



									
Lane Group	SBL	SBT	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Internal Link Dist (ft)		448				191			
Turn Bay Length (ft)			200						
Base Capacity (vph)		1045	980			129			
Starvation Cap Reductn		197	0			0			
Spillback Cap Reductn		0	0			0			
Storage Cap Reductn		0	0			0			
Reduced v/c Ratio		0.51	0.18			0.12			
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBL	NBT	NBR
Lane Configurations												
Traffic Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Future Volume (vph)	5	161	12	7	6	25	2	7	1	1	405	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0					4.0	
Lane Util. Factor		0.95	0.95			1.00					1.00	
Frt		1.00	0.99			0.97					1.00	
Flt Protected		0.95	0.96			0.99					1.00	
Satd. Flow (prot)		1665	1666			1793					1824	
Flt Permitted		0.73	0.74			0.27					1.00	
Satd. Flow (perm)		1275	1280			491					1822	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91
Adj. Flow (vph)	6	179	13	8	7	28	2	8	1	1	445	4
RTOR Reduction (vph)	0	0	3	0	0	7	0	0	0	0	1	0
Lane Group Flow (vph)	0	103	100	0	0	38	0	0	0	0	450	0
Heavy Vehicles (%)	3%	3%	3%	3%	2%	2%	2%	2%	4%	4%	4%	4%
Turn Type	Perm	Perm	NA		Perm	NA			Perm	Perm	NA	
Protected Phases			3			8					2	
Permitted Phases	3	3			8				2	2		
Actuated Green, G (s)		12.0	12.0			9.8					46.1	
Effective Green, g (s)		14.0	14.0			11.8					48.1	
Actuated g/C Ratio		0.14	0.14			0.12					0.48	
Clearance Time (s)		6.0	6.0			6.0					6.0	
Vehicle Extension (s)		3.0	3.0			3.0					3.0	
Lane Grp Cap (vph)		178	179			57					876	
v/s Ratio Prot												
v/s Ratio Perm		c0.08	0.08			c0.08					c0.25	
v/c Ratio		0.58	0.56			0.67					0.51	
Uniform Delay, d1		40.2	40.1			42.2					17.9	
Progression Factor		1.00	1.00			1.00					1.00	
Incremental Delay, d2		4.5	4.0			25.6					2.2	
Delay (s)		44.7	44.1			67.8					20.0	
Level of Service		D	D			E					C	
Approach Delay (s)			44.4			67.8					20.0	
Approach LOS			D			E					C	
Intersection Summary												
HCM 2000 Control Delay			21.4									
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			100.0								20.0	
Intersection Capacity Utilization			53.4%								A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

AM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

							
Movement	SBL	SBT	SBR	SBR2	SEL2	SEL	SER
Lane Configurations							
Traffic Volume (vph)	2	390	158	2	6	2	6
Future Volume (vph)	2	390	158	2	6	2	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0	
Lane Util. Factor		1.00	1.00			1.00	
Frt		1.00	0.85			0.94	
Flt Protected		1.00	1.00			0.97	
Satd. Flow (prot)		1862	1583			1705	
Flt Permitted		1.00	1.00			0.97	
Satd. Flow (perm)		1860	1583			1705	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	433	176	2	7	2	7
RTOR Reduction (vph)	0	0	92	0	0	0	0
Lane Group Flow (vph)	0	435	86	0	0	16	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm		Perm	Prot	
Protected Phases		6				4	
Permitted Phases	6		6		4		
Actuated Green, G (s)		46.1	46.1			2.1	
Effective Green, g (s)		48.1	48.1			4.1	
Actuated g/C Ratio		0.48	0.48			0.04	
Clearance Time (s)		6.0	6.0			6.0	
Vehicle Extension (s)		3.0	3.0			3.0	
Lane Grp Cap (vph)		894	761			69	
v/s Ratio Prot							
v/s Ratio Perm		0.23	0.05			0.01	
v/c Ratio		0.49	0.11			0.23	
Uniform Delay, d1		17.6	14.2			46.4	
Progression Factor		0.57	0.74			1.00	
Incremental Delay, d2		0.3	0.0			1.7	
Delay (s)		10.4	10.7			48.1	
Level of Service		B	B			D	
Approach Delay (s)		10.5				48.1	
Approach LOS		B				D	
Intersection Summary							

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Future Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		25	0		175	150		150	100		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			175			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			600			528			5415	
Travel Time (s)		4.5			13.6			12.0			123.1	
Peak Hour Factor	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.95	0.95	0.95
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	23	0	328	341	0	1	1159	0	283	727	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			20			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3			3								
Detector Phase	3	3		3	3		1	2		1	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	31.0		11.0	31.0	
Total Split (s)	28.0	28.0		28.0	28.0		23.0	45.0		23.0	45.0	
Total Split (%)	25.5%	25.5%		25.5%	25.5%		20.9%	40.9%		20.9%	40.9%	
Maximum Green (s)	22.0	22.0		22.0	22.0		17.0	39.0		17.0	39.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Walk Time (s)								0.0			0.0	
Flash Dont Walk (s)								15.0			15.0	
Pedestrian Calls (#/hr)								5			5	
v/c Ratio	0.02	0.04		0.83	0.49		0.00	0.77		0.92	0.48	
Control Delay	29.3	28.2		56.8	6.5		43.0	21.8		79.3	24.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.8		0.0	0.0	
Total Delay	29.3	28.2		56.8	6.5		43.0	22.5		79.3	24.7	
Queue Length 50th (ft)	2	11		217	5		1	213		199	186	
Queue Length 95th (ft)	9	31		#370	75		m2	390		#357	269	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	6%	6%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	0
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			520			448			5335	
Turn Bay Length (ft)							150			100		
Base Capacity (vph)	155	522		393	691		309	1497		309	1510	
Starvation Cap Reductn	0	0		0	0		0	118		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	3	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.04		0.83	0.49		0.00	0.84		0.92	0.48	

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 4 (4%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 90

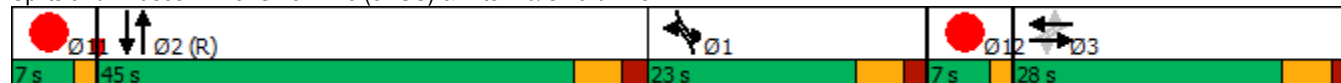
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 18: Union Ave (3BUS) & Rite Aid/Gilford Ave



Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

18: Union Ave (3BUS) & Rite Aid/Gilford Ave

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Future Volume (vph)	3	20	1	308	8	312	1	724	412	269	680	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.85		1.00	0.95		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1851		1787	1606		1787	3380		1787	3566	
Flt Permitted	0.30	1.00		0.74	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	552	1851		1396	1606		1787	3380		1787	3566	
Peak-hour factor, PHF	0.90	0.90	0.90	0.94	0.94	0.94	0.98	0.98	0.98	0.95	0.95	0.95
Adj. Flow (vph)	3	22	1	328	9	332	1	739	420	283	716	11
RTOR Reduction (vph)	0	1	0	0	238	0	0	68	0	0	1	0
Lane Group Flow (vph)	3	22	0	328	103	0	1	1091	0	283	726	0
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3			3								
Actuated Green, G (s)	29.0	29.0		29.0	29.0		17.1	42.9		17.1	42.9	
Effective Green, g (s)	31.0	31.0		31.0	31.0		19.1	44.9		19.1	44.9	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.17	0.41		0.17	0.41	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	155	521		393	452		310	1379		310	1455	
v/s Ratio Prot		0.01			0.06		0.00	c0.32		c0.16	0.20	
v/s Ratio Perm	0.01			c0.23								
v/c Ratio	0.02	0.04		0.83	0.23		0.00	0.79		0.91	0.50	
Uniform Delay, d1	28.5	28.7		37.1	30.3		37.6	28.5		44.6	24.2	
Progression Factor	1.00	1.00		1.00	1.00		1.14	0.73		1.00	1.00	
Incremental Delay, d2	0.1	0.0		14.1	0.3		0.0	3.8		29.7	1.2	
Delay (s)	28.6	28.7		51.2	30.6		43.0	24.5		74.3	25.4	
Level of Service	C	C		D	C		D	C		E	C	
Approach Delay (s)		28.7			40.7			24.5			39.1	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			33.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			110.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			81.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

PM 2037 B-MIT-Non Constrained_r1

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

Timing Plan: OPTIMIZE

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Future Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0	0		0				0	0
Storage Lanes		1		0	0		0				0	0
Taper Length (ft)		25			25							25
Right Turn on Red				Yes				Yes			Yes	
Link Speed (mph)			30			30				30		
Link Distance (ft)			283			639				1635		
Travel Time (s)			6.4			14.5				37.2		
Peak Hour Factor	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%
Shared Lane Traffic (%)		46%										
Lane Group Flow (vph)	0	190	191	0	0	68	0	0	0	613	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Left	Right	Right	Left	Left	Right	Left
Median Width(ft)			12			12				0		
Link Offset(ft)			0			0				0		
Crosswalk Width(ft)			16			16				16		
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	Perm	NA		Perm	NA			Perm	NA		Perm
Protected Phases			3			8				2		
Permitted Phases	3	3			8				2			6
Detector Phase	3	3	3		8	8			2	2		6
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0		5.0	5.0			10.0	10.0		10.0
Minimum Split (s)	17.0	17.0	17.0		11.0	11.0			29.0	29.0		16.0
Total Split (s)	20.0	20.0	20.0		20.0	20.0			45.0	45.0		45.0
Total Split (%)	18.2%	18.2%	18.2%		18.2%	18.2%			40.9%	40.9%		40.9%
Maximum Green (s)	14.0	14.0	14.0		14.0	14.0			39.0	39.0		39.0
Yellow Time (s)	4.0	4.0	4.0		4.0	4.0			4.0	4.0		4.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0			2.0	2.0		2.0
Lost Time Adjust (s)		-2.0	-2.0			-2.0				-2.0		
Total Lost Time (s)		4.0	4.0			4.0				4.0		
Lead/Lag	Lag	Lag	Lag		Lead	Lead						
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0			3.0	3.0		3.0
Recall Mode	None	None	None		None	None			C-Min	C-Min		Min
Walk Time (s)	0.0	0.0	0.0						0.0	0.0		
Flash Dont Walk (s)	11.0	11.0	11.0						23.0	23.0		
Pedestrian Calls (#/hr)	5	5	5						10	10		
v/c Ratio		0.82	0.81			0.62				0.73		
Control Delay		72.2	71.3			61.0				32.4		
Queue Delay		0.0	0.0			0.0				0.4		
Total Delay		72.2	71.3			61.0				32.8		
Queue Length 50th (ft)		~152	~151			35				353		
Queue Length 95th (ft)		#304	#306			#116				#607		

									
Lane Group	SBT	SBR	SBR2	SEL2	SEL	SER	SER2	Ø11	Ø12
Lane Configurations									
Traffic Volume (vph)	506	223	2	6	4	9	8		
Future Volume (vph)	506	223	2	6	4	9	8		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900		
Storage Length (ft)		200			0	0			
Storage Lanes		0			1	0			
Taper Length (ft)					25				
Right Turn on Red			Yes				Yes		
Link Speed (mph)	30				30				
Link Distance (ft)	528				271				
Travel Time (s)	12.0				6.2				
Peak Hour Factor	0.97	0.97	0.97	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%		
Shared Lane Traffic (%)									
Lane Group Flow (vph)	526	232	0	0	30	0	0		
Enter Blocked Intersection	No	No	No	No	No	No	No		
Lane Alignment	Left	Right	Right	Left	Left	Right	Right		
Median Width(ft)	0				12				
Link Offset(ft)	0				0				
Crosswalk Width(ft)	16				16				
Two way Left Turn Lane									
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Turn Type	NA	Perm		Perm	Prot				
Protected Phases	6				4			11	12
Permitted Phases		6		4					
Detector Phase	6	6		4	4				
Switch Phase									
Minimum Initial (s)	10.0	10.0		5.0	5.0			1.0	1.0
Minimum Split (s)	16.0	16.0		11.0	11.0			7.0	7.0
Total Split (s)	45.0	45.0		11.0	11.0			7.0	7.0
Total Split (%)	40.9%	40.9%		10.0%	10.0%			6%	6%
Maximum Green (s)	39.0	39.0		5.0	5.0			5.0	5.0
Yellow Time (s)	4.0	4.0		4.0	4.0			2.0	2.0
All-Red Time (s)	2.0	2.0		2.0	2.0			0.0	0.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0				
Total Lost Time (s)	4.0	4.0			4.0				
Lead/Lag									
Lead-Lag Optimize?									
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0
Recall Mode	Min	Min		None	None			None	None
Walk Time (s)								5.0	5.0
Flash Dont Walk (s)								0.0	0.0
Pedestrian Calls (#/hr)								10	5
v/c Ratio	0.62	0.28			0.11				
Control Delay	13.0	1.8			0.7				
Queue Delay	0.1	0.0			0.0				
Total Delay	13.1	1.8			0.7				
Queue Length 50th (ft)	161	12			0				
Queue Length 95th (ft)	m209	m26			0				

												
Lane Group	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL
Internal Link Dist (ft)			203			559				1555		
Turn Bay Length (ft)												
Base Capacity (vph)		233	235			113				845		
Starvation Cap Reductn		0	0			0				0		
Spillback Cap Reductn		0	0			0				36		
Storage Cap Reductn		0	0			0				0		
Reduced v/c Ratio		0.82	0.81			0.60				0.76		

Intersection Summary

Area Type: Other

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

~ Volume exceeds capacity, queue is theoretically infinite.

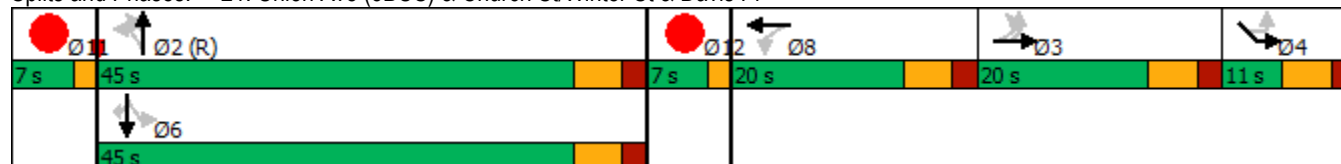
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl



									
Lane Group	SBT	SBR	SBR2	SEL2	SEL	SER	SER2	Ø11	Ø12
Internal Link Dist (ft)	448				191				
Turn Bay Length (ft)		200							
Base Capacity (vph)	844	823			283				
Starvation Cap Reductn	21	0			0				
Spillback Cap Reductn	0	0			0				
Storage Cap Reductn	0	0			0				
Reduced v/c Ratio	0.64	0.28			0.11				
Intersection Summary									

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL2	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Future Volume (vph)	6	308	28	5	13	31	4	14	1	531	20	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0			4.0				4.0		
Lane Util. Factor		0.95	0.95			1.00				1.00		
Frt		1.00	1.00			0.96				1.00		
Flt Protected		0.95	0.96			0.99				1.00		
Satd. Flow (prot)		1681	1694			1771				1872		
Flt Permitted		0.71	0.72			0.33				1.00		
Satd. Flow (perm)		1261	1269			582				1871		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.97
Adj. Flow (vph)	7	338	31	5	14	34	4	16	1	590	22	4
RTOR Reduction (vph)	0	0	1	0	0	10	0	0	0	1	0	0
Lane Group Flow (vph)	0	190	190	0	0	58	0	0	0	612	0	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%
Turn Type	Perm	Perm	NA		Perm	NA			Perm	NA		Perm
Protected Phases			3			8				2		
Permitted Phases	3	3			8				2			6
Actuated Green, G (s)		18.3	18.3			16.7				42.0		
Effective Green, g (s)		20.3	20.3			18.7				44.0		
Actuated g/C Ratio		0.18	0.18			0.17				0.40		
Clearance Time (s)		6.0	6.0			6.0				6.0		
Vehicle Extension (s)		3.0	3.0			3.0				3.0		
Lane Grp Cap (vph)		232	234			98				748		
v/s Ratio Prot												
v/s Ratio Perm		c0.15	0.15			c0.10				c0.33		
v/c Ratio		0.82	0.81			0.59				0.82		
Uniform Delay, d1		43.1	43.0			42.1				29.4		
Progression Factor		1.00	1.00			1.00				1.00		
Incremental Delay, d2		19.7	19.0			9.2				9.7		
Delay (s)		62.8	62.0			51.4				39.1		
Level of Service		E	E			D				D		
Approach Delay (s)			62.4			51.4				39.1		
Approach LOS			E			D				D		
Intersection Summary												
HCM 2000 Control Delay			32.9									
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			110.0							20.0		
Intersection Capacity Utilization			69.4%							C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

PM 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

							
Movement	SBT	SBR	SBR2	SEL2	SEL	SER	SER2
Lane Configurations							
Traffic Volume (vph)	506	223	2	6	4	9	8
Future Volume (vph)	506	223	2	6	4	9	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		
Lane Util. Factor	1.00	1.00			1.00		
Frt	1.00	0.85			0.91		
Flt Protected	1.00	1.00			0.98		
Satd. Flow (prot)	1880	1599			1673		
Flt Permitted	1.00	1.00			0.98		
Satd. Flow (perm)	1874	1599			1673		
Peak-hour factor, PHF	0.97	0.97	0.97	0.90	0.90	0.90	0.90
Adj. Flow (vph)	522	230	2	7	4	10	9
RTOR Reduction (vph)	0	113	0	0	29	0	0
Lane Group Flow (vph)	526	119	0	0	1	0	0
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	2%
Turn Type	NA	Perm		Perm	Prot		
Protected Phases	6				4		
Permitted Phases		6		4			
Actuated Green, G (s)	42.0	42.0			3.0		
Effective Green, g (s)	44.0	44.0			5.0		
Actuated g/C Ratio	0.40	0.40			0.05		
Clearance Time (s)	6.0	6.0			6.0		
Vehicle Extension (s)	3.0	3.0			3.0		
Lane Grp Cap (vph)	749	639			76		
v/s Ratio Prot							
v/s Ratio Perm	0.28	0.07			0.00		
v/c Ratio	0.70	0.19			0.02		
Uniform Delay, d1	27.5	21.4			50.2		
Progression Factor	0.41	0.20			1.00		
Incremental Delay, d2	2.4	0.1			0.1		
Delay (s)	13.6	4.5			50.2		
Level of Service	B	A			D		
Approach Delay (s)	10.8				50.2		
Approach LOS	B				D		
Intersection Summary							

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Future Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		25	0		175	150		150	100		75
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25			25			175			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			600			528			5415	
Travel Time (s)		4.5			13.6			12.0			123.1	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	10	13	0	256	260	0	3	1076	0	192	685	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			20			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3			3								
Detector Phase	3	3		3	3		1	2		1	2	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		11.0	31.0		11.0	31.0	
Total Split (s)	27.0	27.0		27.0	27.0		18.0	41.0		18.0	41.0	
Total Split (%)	27.0%	27.0%		27.0%	27.0%		18.0%	41.0%		18.0%	41.0%	
Maximum Green (s)	21.0	21.0		21.0	21.0		12.0	35.0		12.0	35.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag							Lag	Lead		Lag	Lead	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		None	C-Min		None	C-Min	
Walk Time (s)								0.0			0.0	
Flash Dont Walk (s)								15.0			15.0	
Pedestrian Calls (#/hr)								5			5	
v/c Ratio	0.05	0.03		0.72	0.44		0.01	0.65		0.78	0.41	
Control Delay	26.2	20.9		45.4	6.5		38.7	23.2		64.3	19.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.2		0.0	0.0	
Total Delay	26.2	20.9		45.4	6.5		38.7	23.4		64.3	19.5	
Queue Length 50th (ft)	5	4		146	4		2	291		120	145	
Queue Length 95th (ft)	17	18		226	61		m6	284		#228	232	

Lane Group	Ø11	Ø12
Lane Configurations		
Traffic Volume (vph)		
Future Volume (vph)		
Ideal Flow (vphpl)		
Storage Length (ft)		
Storage Lanes		
Taper Length (ft)		
Right Turn on Red		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Enter Blocked Intersection		
Lane Alignment		
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor		
Turn Type		
Protected Phases	11	12
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	1.0	1.0
Minimum Split (s)	7.0	7.0
Total Split (s)	7.0	7.0
Total Split (%)	7%	7%
Maximum Green (s)	5.0	5.0
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		
Lead-Lag Optimize?		
Vehicle Extension (s)	3.0	3.0
Recall Mode	None	None
Walk Time (s)	5.0	5.0
Flash Dont Walk (s)	0.0	0.0
Pedestrian Calls (#/hr)	5	0
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
Queue Length 50th (ft)		
Queue Length 95th (ft)		

Lanes, Volumes, Timings
18: Union Ave (3BUS) & Rite Aid/Gilford Ave

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		120			520			448			5335	
Turn Bay Length (ft)							150			100		
Base Capacity (vph)	197	474		370	607		250	1654		250	1690	
Starvation Cap Reductn	0	0		0	0		0	110		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	7	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.03		0.69	0.43		0.01	0.70		0.77	0.41	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBSB, Start of Green

Natural Cycle: 80

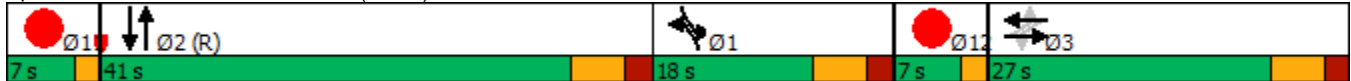
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 18: Union Ave (3BUS) & Rite Aid/Gilford Ave



Lane Group	Ø11	Ø12
------------	-----	-----

Internal Link Dist (ft)		
-------------------------	--	--

Turn Bay Length (ft)		
----------------------	--	--

Base Capacity (vph)		
---------------------	--	--

Starvation Cap Reductn		
------------------------	--	--

Spillback Cap Reductn		
-----------------------	--	--

Storage Cap Reductn		
---------------------	--	--

Reduced v/c Ratio		
-------------------	--	--

Intersection Summary		
----------------------	--	--

HCM Signalized Intersection Capacity Analysis

18: Union Ave (3BUS) & Rite Aid/Gilford Ave

SAT 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Future Volume (vph)	9	8	4	230	8	226	3	726	242	173	611	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.86		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1777		1770	1593		1787	3440		1787	3570	
Flt Permitted	0.40	1.00		0.75	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	740	1777		1395	1593		1787	3440		1787	3570	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	10	9	4	256	9	251	3	807	269	192	679	6
RTOR Reduction (vph)	0	3	0	0	187	0	0	28	0	0	1	0
Lane Group Flow (vph)	10	10	0	256	73	0	3	1048	0	192	684	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	
Protected Phases		3			3		1	2		1	2	
Permitted Phases	3			3								
Actuated Green, G (s)	23.5	23.5		23.5	23.5		11.8	43.7		11.8	43.7	
Effective Green, g (s)	25.5	25.5		25.5	25.5		13.8	45.7		13.8	45.7	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.14	0.46		0.14	0.46	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	188	453		355	406		246	1572		246	1631	
v/s Ratio Prot		0.01			0.05		0.00	c0.30		c0.11	0.19	
v/s Ratio Perm	0.01			c0.18								
v/c Ratio	0.05	0.02		0.72	0.18		0.01	0.67		0.78	0.42	
Uniform Delay, d1	28.1	27.9		34.0	29.1		37.2	21.2		41.6	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.03	1.02		1.00	1.00	
Incremental Delay, d2	0.1	0.0		7.1	0.2		0.0	2.1		14.8	0.8	
Delay (s)	28.3	27.9		41.1	29.3		38.5	23.8		56.4	19.0	
Level of Service	C	C		D	C		D	C		E	B	
Approach Delay (s)		28.1			35.1			23.9			27.2	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			27.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			66.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings

SAT 2037 B-MIT-Non Constrained_r1

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

Timing Plan: OPTIMIZE

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Future Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0				0		0	0	
Storage Lanes	1		0	0				0		0	0	
Taper Length (ft)	25			25				25			25	
Right Turn on Red			Yes			Yes				Yes		
Link Speed (mph)		30			30				30			30
Link Distance (ft)		283			639				1635			528
Travel Time (s)		6.4			14.5				37.2			12.0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.90	0.90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%
Shared Lane Traffic (%)	41%											
Lane Group Flow (vph)	137	137	0	0	31	0	0	0	575	0	0	477
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Left	Right	Left	Left
Median Width(ft)		12			12				0			0
Link Offset(ft)		0			0				0			0
Crosswalk Width(ft)		16			16				16			16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		3			8				2			6
Permitted Phases	3			8			2	2			6	
Detector Phase	3	3		8	8		2	2	2		6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0		10.0	10.0
Minimum Split (s)	17.0	17.0		11.0	11.0		29.0	29.0	29.0		16.0	16.0
Total Split (s)	25.0	25.0		11.0	11.0		39.0	39.0	39.0		39.0	39.0
Total Split (%)	25.0%	25.0%		11.0%	11.0%		39.0%	39.0%	39.0%		39.0%	39.0%
Maximum Green (s)	19.0	19.0		5.0	5.0		33.0	33.0	33.0		33.0	33.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0				-2.0			-2.0
Total Lost Time (s)	4.0	4.0			4.0				4.0			4.0
Lead/Lag	Lag	Lag		Lead	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0		3.0	3.0
Recall Mode	None	None		None	None		C-Min	C-Min	C-Min		Min	Min
Walk Time (s)	0.0	0.0					0.0	0.0	0.0			
Flash Dont Walk (s)	11.0	11.0					23.0	23.0	23.0			
Pedestrian Calls (#/hr)	5	5					10	10	10			
v/c Ratio	0.62	0.59			0.12				0.49			0.40
Control Delay	50.2	47.3			0.9				16.9			6.9
Queue Delay	0.0	0.0			0.0				0.0			0.1
Total Delay	50.2	47.3			0.9				16.9			6.9
Queue Length 50th (ft)	85	83			0				181			46
Queue Length 95th (ft)	147	144			0				#544			164

							
Lane Group	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Lane Configurations							
Traffic Volume (vph)	139	2	2	0	1		
Future Volume (vph)	139	2	2	0	1		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900		
Storage Length (ft)	200			0	0		
Storage Lanes	0			1	0		
Taper Length (ft)				25			
Right Turn on Red		Yes					
Link Speed (mph)				30			
Link Distance (ft)				271			
Travel Time (s)				6.2			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90		
Heavy Vehicles (%)	1%	1%	2%	2%	2%		
Shared Lane Traffic (%)							
Lane Group Flow (vph)	156	0	0	3	0		
Enter Blocked Intersection	No	No	No	No	No		
Lane Alignment	Right	Right	Left	Left	Right		
Median Width(ft)				12			
Link Offset(ft)				0			
Crosswalk Width(ft)				16			
Two way Left Turn Lane							
Headway Factor	1.00	1.00	1.00	1.00	1.00		
Turn Type	Perm		Perm	Prot			
Protected Phases				4		11	12
Permitted Phases	6		4				
Detector Phase	6		4	4			
Switch Phase							
Minimum Initial (s)	10.0		5.0	5.0		1.0	1.0
Minimum Split (s)	16.0		11.0	11.0		7.0	7.0
Total Split (s)	39.0		11.0	11.0		7.0	7.0
Total Split (%)	39.0%		11.0%	11.0%		7%	7%
Maximum Green (s)	33.0		5.0	5.0		5.0	5.0
Yellow Time (s)	4.0		4.0	4.0		2.0	2.0
All-Red Time (s)	2.0		2.0	2.0		0.0	0.0
Lost Time Adjust (s)	-2.0			-2.0			
Total Lost Time (s)	4.0			4.0			
Lead/Lag							
Lead-Lag Optimize?							
Vehicle Extension (s)	3.0		3.0	3.0		3.0	3.0
Recall Mode	Min		None	None		None	None
Walk Time (s)						5.0	5.0
Flash Dont Walk (s)						0.0	0.0
Pedestrian Calls (#/hr)						10	5
v/c Ratio	0.14			0.02			
Control Delay	0.5			43.7			
Queue Delay	0.0			0.0			
Total Delay	0.5			43.7			
Queue Length 50th (ft)	0			2			
Queue Length 95th (ft)	m6			11			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Internal Link Dist (ft)		203			559				1555			448
Turn Bay Length (ft)												
Base Capacity (vph)	273	287			259				1167			1181
Starvation Cap Reductn	0	0			0				0			98
Spillback Cap Reductn	0	0			0				10			0
Storage Cap Reductn	0	0			0				0			0
Reduced v/c Ratio	0.50	0.48			0.12				0.50			0.44

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBTL, Start of Green

Natural Cycle: 85

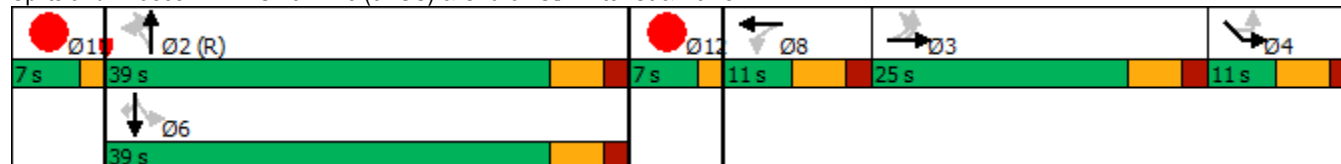
Control Type: Actuated-Coordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

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

Splits and Phases: 21: Union Ave (3BUS) & Church St/Winter St & Davis Pl



							
Lane Group	SBR	SBR2	SEL2	SEL	SER	Ø11	Ø12
Internal Link Dist (ft)				191			
Turn Bay Length (ft)	200						
Base Capacity (vph)	1086			129			
Starvation Cap Reductn	0			0			
Spillback Cap Reductn	0			0			
Storage Cap Reductn	0			0			
Reduced v/c Ratio	0.14			0.02			
Intersection Summary							

HCM Signalized Intersection Capacity Analysis
21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

SAT 2037 B-MIT-Non Constrained_r1

Timing Plan: OPTIMIZE

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR2	NBL2	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Future Volume (vph)	209	31	7	9	13	6	6	1	512	4	5	424
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0				4.0			4.0
Lane Util. Factor	0.95	0.95			1.00				1.00			1.00
Frt	1.00	0.99			0.97				1.00			1.00
Flt Protected	0.95	0.97			0.98				1.00			1.00
Satd. Flow (prot)	1681	1695			1777				1860			1880
Flt Permitted	0.74	0.77			0.51				0.99			0.99
Satd. Flow (perm)	1304	1357			919				1849			1869
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91	0.91	0.91	0.90	0.90
Adj. Flow (vph)	232	34	8	10	14	7	7	1	563	4	6	471
RTOR Reduction (vph)	0	2	0	0	29	0	0	0	0	0	0	0
Lane Group Flow (vph)	137	135	0	0	2	0	0	0	575	0	0	477
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	1%	1%
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA		Perm	NA
Protected Phases		3			8				2			6
Permitted Phases	3			8			2	2			6	
Actuated Green, G (s)	15.0	15.0			3.2				50.8			50.8
Effective Green, g (s)	17.0	17.0			5.2				52.8			52.8
Actuated g/C Ratio	0.17	0.17			0.05				0.53			0.53
Clearance Time (s)	6.0	6.0			6.0				6.0			6.0
Vehicle Extension (s)	3.0	3.0			3.0				3.0			3.0
Lane Grp Cap (vph)	221	230			47				976			986
v/s Ratio Prot												
v/s Ratio Perm	c0.11	0.10			c0.00				c0.31			0.26
v/c Ratio	0.62	0.58			0.03				0.59			0.48
Uniform Delay, d1	38.5	38.2			45.0				16.2			15.0
Progression Factor	1.00	1.00			1.00				1.00			0.42
Incremental Delay, d2	5.1	3.8			0.3				2.6			0.3
Delay (s)	43.6	42.0			45.3				18.8			6.7
Level of Service	D	D			D				B			A
Approach Delay (s)		42.8			45.3				18.8			5.6
Approach LOS		D			D				B			A
Intersection Summary												
HCM 2000 Control Delay			18.2									
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			100.0						20.0			
Intersection Capacity Utilization			60.4%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

21: Union Ave (3BUS) & Church St/Winter St & Davis Pl

SAT 2037 B-MIT-Non Constrained_r1
Timing Plan: OPTIMIZE

					
Movement	SBR	SBR2	SEL2	SEL	SER
Lane Configurations					
Traffic Volume (vph)	139	2	2	0	1
Future Volume (vph)	139	2	2	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	
Lane Util. Factor	1.00			1.00	
Frt	0.85			0.95	
Flt Protected	1.00			0.97	
Satd. Flow (prot)	1599			1722	
Flt Permitted	1.00			0.97	
Satd. Flow (perm)	1599			1722	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	154	2	2	0	1
RTOR Reduction (vph)	74	0	0	0	0
Lane Group Flow (vph)	82	0	0	3	0
Heavy Vehicles (%)	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Prot	
Protected Phases				4	
Permitted Phases	6		4		
Actuated Green, G (s)	50.8			1.0	
Effective Green, g (s)	52.8			3.0	
Actuated g/C Ratio	0.53			0.03	
Clearance Time (s)	6.0			6.0	
Vehicle Extension (s)	3.0			3.0	
Lane Grp Cap (vph)	844			51	
v/s Ratio Prot					
v/s Ratio Perm	0.05			0.00	
v/c Ratio	0.10			0.06	
Uniform Delay, d1	11.7			47.1	
Progression Factor	0.20			1.00	
Incremental Delay, d2	0.0			0.5	
Delay (s)	2.4			47.6	
Level of Service	A			D	
Approach Delay (s)				47.6	
Approach LOS				D	
Intersection Summary					

ATTACHMENT Q (Updated Rev1)

Aerial Intersection Overlays

#14 Parade Rd / N. Main St at Lexington – Signal

#14 Parade Rd / N. Main St at Lexington – Roundabout

#15 N. Main St at Oak St

Oak Street Sightline photos

#19 & #16 N. Main St at New Salem St and Veterans Sq/Church St

#13 Union Street at Elm St/Clinton St – NBL

#13 Union Street at Elm St/Clinton St – Non-Constrained

#18 & #21 Gilford Ave / Rite Aid and Union Street at Church/Winter

#13 Parade Rd/N.Main St at Lexington Dr

NB (35mph)
EXISTING LANES

SB (35mph)
STORAGE LANE: 355'
TRANSITION: 75"
LANE TAPER: 245' (12' LANE)

OVERALL LOS

2037 No-Build
AM: C
PM: F
SAT: A

2037 Build
AM: F
PM: F
SAT: C

2037 Signal
AM: B
PM: C
SAT: B

8' SHOULDER

12' LANES

R.O.W.

R.O.W.

S



#14 Parade Rd/N.Main St at Lexington Dr

OVERALL LOS

2037 No-Build
AM: C
PM: F
SAT: A

2037 Build
AM: F
PM: F
SAT: C

2037 Roundabout
AM: C
PM: A
SAT: A

8' SHOULDER

12' LANES

R.O.W.

R.O.W.



#15 N.Main St at Oak St

NB (30mph)
STORAGE LANE: 350'
TRANSITION: 75'
TURN TAPER: 75'
LANE TAPER: 165' (11' LANE)

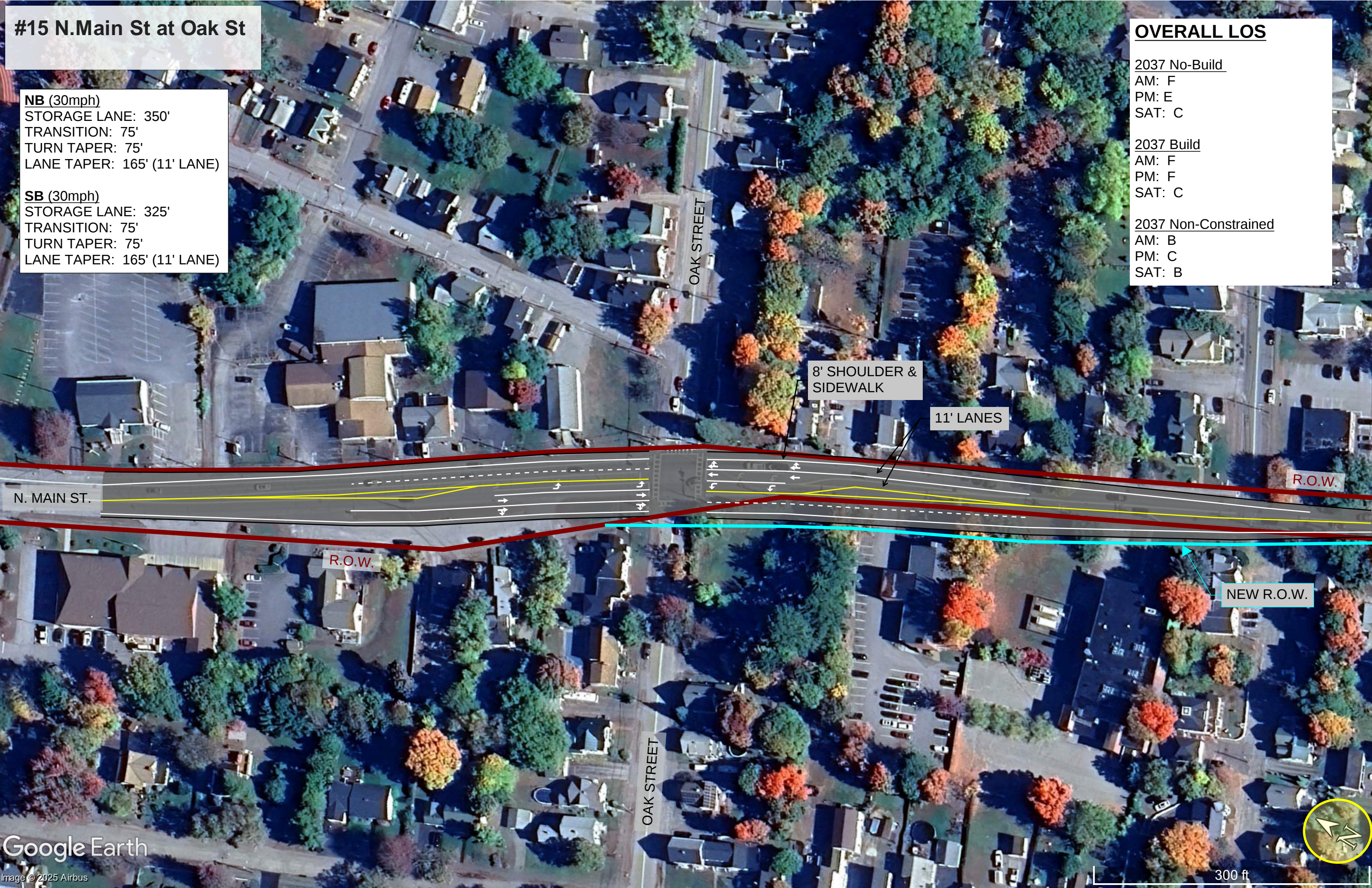
SB (30mph)
STORAGE LANE: 325'
TRANSITION: 75'
TURN TAPER: 75'
LANE TAPER: 165' (11' LANE)

OVERALL LOS

2037 No-Build
AM: F
PM: E
SAT: C

2037 Build
AM: F
PM: F
SAT: C

2037 Non-Constrained
AM: B
PM: C
SAT: B



#19 & #16 - N.Main St at New Salem St and Veterans Sq / Church St

NB (30mph)
STORAGE LANE: 50'
TRANSITION: 75'
TURN TAPER: 75'
LANE TAPER: 180' (12' LANE)

SB (30mph)
STORAGE LANE: 50'
TRANSITION: 75'
LANE TAPER: 180' (12' LANE)

OVERALL LOS
Veterans/Church

2037 No-Build
AM: D
PM: C
SAT: C

2037 Build
AM: E
PM: E
SAT: C

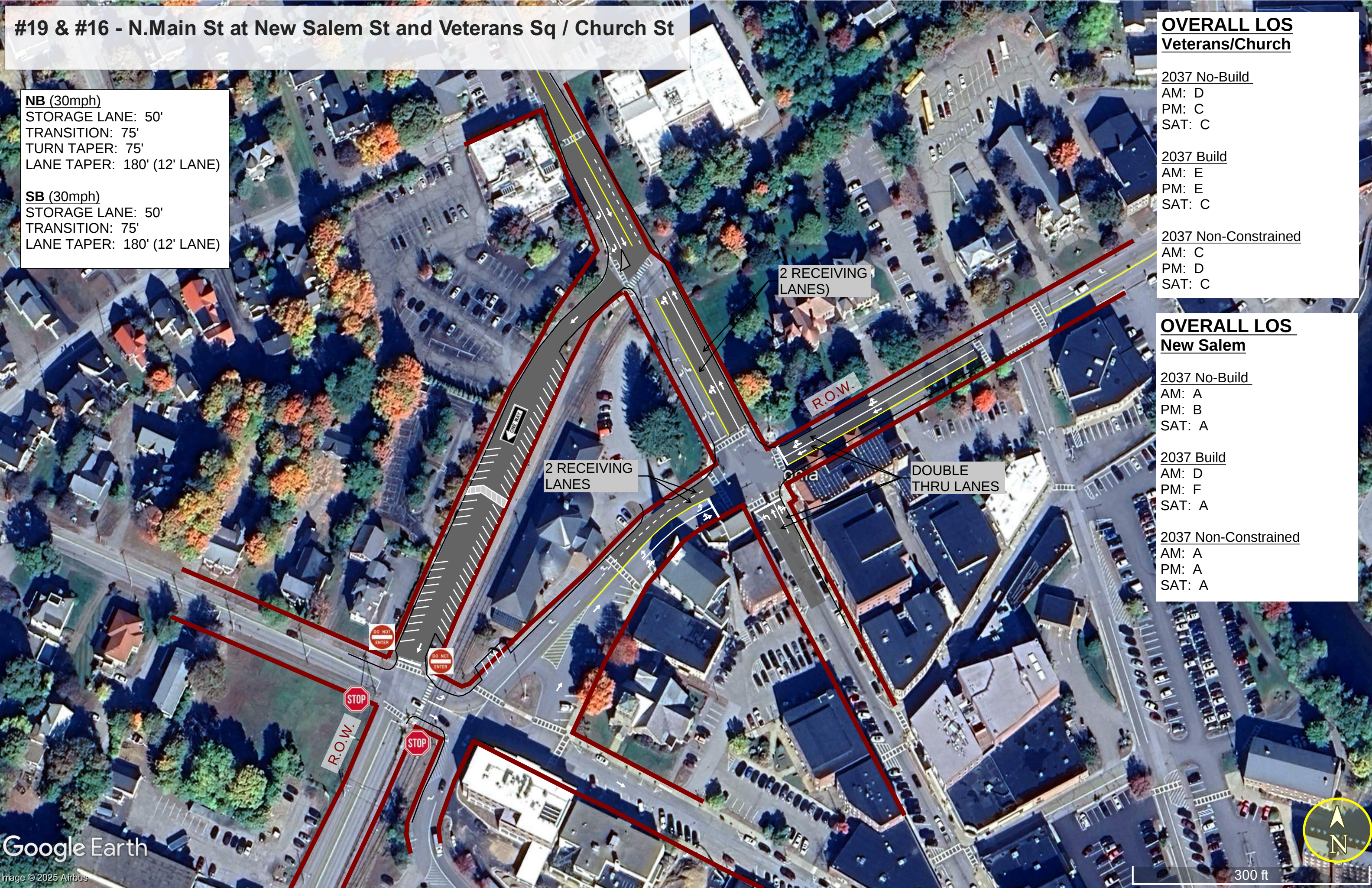
2037 Non-Constrained
AM: C
PM: D
SAT: C

OVERALL LOS
New Salem

2037 No-Build
AM: A
PM: B
SAT: A

2037 Build
AM: D
PM: F
SAT: A

2037 Non-Constrained
AM: A
PM: A
SAT: A



#13 - Union Ave at Elm St / Clinton St

OVERALL LOS

2037 No-Build
AM: D
PM: F
SAT: F

2037 Build
AM: F
PM: F
SAT: F

2037 NBL
AM: D
PM: F
SAT: F



R.O.W.



#13 - Union Ave at Elm St / Clinton St

OVERALL LOS

2037 No-Build
AM: D
PM: F
SAT: F

2037 Build
AM: F
PM: F
SAT: F

2037 Non-Constrained
AM: D
PM: D
SAT: D



#18 & #21 - Gilford Ave/Right Aid and Union St at Church St/Winter St

OVERALL LOS
Rite Aid/Gilford

2037 No-Build
AM: F
PM: D
SAT: D

2037 Build
AM: F
PM: D
SAT: D

2037 Non-Constrained
AM: C
PM: D
SAT: C

OVERALL LOS
Church/Winter

2037 No-Build
AM: E
PM: F
SAT: D

2037 Build
AM: F
PM: F
SAT: E

2037 Non-Constrained
AM: C
PM: C
SAT: B

Part C (No Change Rev1)

State Intersection Analysis

ATTACHMENTS – Part C (No Change Rev1)

State Intersection Analysis

Part D (No Change Rev1)

Trip Generation and Distribution

ATTACHMENTS – Part D (No Change Rev1)

Trip Generation and Distribution