Appendix E - Kittelson Traffic Analysis

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Date:	June 24, 2009	Project #: 9557.0
To:	Elizabeth Mahon, Portland Bureau of Transportation (PBOT)	
From:	Mike Coleman	
Cc:	Julia Kuhn	
Project:	Division Street: SE 11th Avenue to SE 26th Avenue	
Subject:	Traffic Analysis: Two Lanes versus One Lane in Each Direction	

The purpose of this technical memorandum is to provide a transportation assessment related to the urban design of SE Division Street between SE 11th Avenue and SE 26th Avenue. This review focuses on the feasibility of removing the pro-time lanes and modifying the cross-section of SE Division Street within the study area. The memorandum documents the City's design and operational guidelines, observations recorded during recent site visits, and forecast operations at the six study intersections under three analysis scenarios (i.e., two lanes in each direction, one lane in each direction with existing signal timings, and one lane in each direction with optimized signal timings). The study intersections are:

- SE 11th Avenue & SE Division Street,
- SE 12th Avenue & SE Division Street,
- SE 17th Avenue & SE Division Street,
- SE 20th Avenue/Ladd Street & SE Division Street,
- SE 21st Avenue & SE Division Street,
- SE 26th Avenue & SE Division Street,

} 7 Corners

DESIGN AND OPERATIONS GUIDELINES

The following information was provided by PBOT Traffic Engineering staff for the purpose of guiding roadway design alternatives for the SE Division Streetscape Project.

Geometric Design

A design speed of 30 miles per hour (mph) is appropriate along SE Division Street. The posted speed is 25 mph. In the Hosford Abernathy school zone, the speed limit is reduced to 20 mph when children are present. The 85th-percentile speed at SE 20th Avenue/21st Avenue/Ladd Street & SE Division Street (Seven corners) is between 26-31 mph.

For the alternatives in which the existing four travel lanes are maintained, 9-foot lanes are acceptable. Otherwise, minimum lane widths should be 10 feet. It is not acceptable to narrow existing sidewalk widths to provide a wider roadway cross-section.

Existing Traffic Signals

All of the signalized intersections along SE Division Street between 11th and 39th Avenues are equipped with 170 controllers. Signal operations improvements must acknowledge the opportunities and limitations associated with 170 controllers

Where traffic conditions allow, minimum green times should be equal to or greater than the time needed to accommodate the associated pedestrian crossing time. Use of pedestrian actuation equipment (push buttons) would be an acceptable alternative at locations where capacity limitations warrant using the green time to accommodate traffic demand when pedestrians are not present.

The City's measures of effectiveness for vehicular traffic are the level of service (LOS) and volume-to-capacity (v/c) ratio. The lowest acceptable level of services at a signalized intersection is LOS D. Intersections with a v/c greater than 0.95 can see no more than a 10 second increase in delay.

Transit

TriMet is responsible for bus service in the corridor and it will be assumed that all stops will remain in their current locations. With relation to this study, it is preferred that any future bus stops be located and designed so buses stop in a traffic lane rather than in the on-street parking area.

SITE VISITS AND FINDINGS

Site visits were conducted in June 2009 during both the a.m. and p.m. peak periods in order to gain a better understanding of the operations at the following three intersections:

- SE 12th Avenue & SE Division Street
- SE 20th Avenue/21st Avenue/Ladd Street & SE Division Street
- SE 26th Avenue & SE Division Street

These intersections were selected because previous analysis indicated that they were the most likely to require two lanes in each direction on SE Division Street in order to perform acceptably.

This field visit allowed for validation of the traffic analysis results. It also provided an important starting point for assessing alternative geometric improvements.

Specific attention was given to:

- various transportation modes and how they interacted,
- lane utilization,
- number of vehicles that could pass through the intersection during a given green phase,
- how often the green phase failed to serve the traffic demand, and
- vehicular queue lengths.

The general conclusions reached for each intersection are discussed below. *The specific observations made at each location are included in Appendix A.*

SE 12th Avenue & SE Division Street

Based on field observations and intersection operations, the two existing westbound lanes that approach SE 12th Avenue and continue through the 11th Avenue intersection need to be maintained to meet the city's guidelines. Weekday a.m. peak period volumes could likely not be served with a single westbound lane as this would result in significant impacts to traffic circulation, traffic delay, and vehicle queuing.

It appears that a single eastbound lane could accommodate traffic during the weekday p.m. peak period.

The locations of the existing bus stops should be reevaluated if any changes are made to striping and lane geometry at this intersection.

SE 20th Avenue/21st Avenue/Ladd Street & SE Division Street

At this intersection, motorists typically prefer to use the inside lane; however, due to the high weekday a.m. peak period volumes, the outside lane is needed to accommodate vehicle demand. For this reason, we don't advise reducing the westbound approach to a single-lane configuration.

We also do not recommend reducing SE Division Street's eastbound approach to a single lane given the intersection's complexity and the space required to make the different movements that this approach serves. The interaction between the unsignalized intersection of Division Street & 20th Avenue (south leg) and the signalized intersection of Division Street & Ladd Street/20th Avenue (north leg) generates an especially complicated condition during the mid-week weekday p.m. peak period. The queue formed at the Ladd Street intersection spills back to the west and beyond the 20th Avenue intersection.

SE 26th Avenue & SE Division Street

The field observations indicate that traffic can operate acceptably with a single-lane configuration for both the westbound and eastbound directions. However, alternatives for accommodating westbound left-turns and eastbound right-turns and reallocating green time to better serve users of the northbound approach should be explored.

TRAFFIC ANALYSIS

The performance of each signalized intersection in the corridor was analyzed using the procedures outlined in the 2000 Highway Capacity Manual (1), published by the Transportation Research Board. *Appendix B includes a description of level of service, the criteria by which it is determined, and how level of service is measured.* The intersection performance analysis provided a way to systematically evaluate and compare the effects of the following three scenarios:

- Existing characteristics - two lanes in each direction on Division Street and under existing signal timing;
- Characteristics proposed by urban design team - one lane in each direction on Division Street and under existing traffic signal timing; and
- Optimized proposed characteristics - one lane in each direction on Division Street and under new traffic signal timing that optimizes the performance of the proposed conditions.

The results are summarized in the following subsections. *The Synchro reports are included in Appendices C, D, and E.*

The Synchro analysis utilized vehicle turning movement counts that were collected in December 2008 and reflect the number of vehicles that passed through a given intersection during the counting period. Where intersection traffic demand exceeds intersection capacity, traffic counts will only reflect intersection capacity. Excess demand is best documented by field observations that confirm whether vehicles are passing through the intersection without having to wait for multiple signal cycles. Traffic volumes vary from day to day and season to season, but the count results are a dependable basis for comparing the relative performance of alternative intersection control strategies.

For the Proposed and Optimized Proposed scenarios, changes in volume-to-capacity ratio were assessed and the remaining capacity (e.g., "reserve capacity") was also determined. The results are summarized in the following subsections.

Existing Characteristics (Two Lanes in Each Direction)

Tables 1 and 2 summarize the delay and level of service results from the Synchro analysis for the existing weekday a.m. and p.m. peak hours respectively.

Table 1 Delay/LOS for Weekday a.m. Peak Hour (with Existing Lanes and Signal Timing)

Intersection with SE Division St	Delay/LOS Under Existing Characteristics				
	EB	WB	NB	SB	OV
SE 11th Ave	23.9 C	15.7 B	X	21.4 C	18.8 B
SE 12th Ave	8.3 A	12.1 B	20.9 C	X	15.8 B
SE 17th Ave	2.0 A	2.9 A	29.8 C	X	7.4 A
SE Ladd Ave/SE 20th Ave	17.4 B	8.6 A	X	22.9 C	12.0 B
SE 21st Ave	0.9 A	51.8 D	37.3 D	X	38.6 D
SE 26th Ave	4.2 A	6.9 A	28.1 C	21.8 B	11.3 B

EB: Eastbound Approach
WB: Westbound Approach
NB: Northbound Approach
SB: Southbound Approach
OV: Overall Intersection
X: Movement does not exist

Table 2 Delay/LOS for Weekday p.m. Peak Hour (with Existing Lanes and Signal Timing)

Intersection with SE Division St	Delay/LOS Under Existing Characteristics				
	EB	WB	NB	SB	OV
SE 11th Ave	21.2 C	14.3 B	X	28.2 C	23.8 C
SE 12th Ave	9.2 A	7.8 A	19.4 B	X	13.6 B
SE 17th Ave	1.4 A	1.4 A	30.8 D	X	2.9 A
SE Ladd Ave/SE 20th Ave	13.7 B	4.0 A	X	35.0 C	16.5 B
SE 21st Ave	1.0 A	19.1 B	42.9 D	X	11.1 B
SE 26th Ave	4.5 A	2.3 A	28.4 C	22.9 C	9.5 A

As shown in Table 2, all movements at all intersections operate acceptably during the weekday a.m. and p.m. peak hours. These analyses results are consistent with the results cited in the January 31, 2009 *Existing Transportation Conditions Summary* memorandum.

Reserve Capacity

Tables 3 and 4 display the "reserve capacities" expressed as percentages, which were calculated by subtracting the existing v/c ratio from 1.0 (an intersection at full capacity). All the intersections and individual movements have reserve capacities available during the weekday p.m. peak hour.

Table 3 Reserve Capacity during Weekday a.m. Peak Hour (with Existing Lanes and Signal Timing)

Intersection with SE Division St	Reserve Capacity (%) Under Existing Characteristics				
	EB	WB	NB	SB	OV
SE 11th Ave	51%	12%	X	48%	26%
SE 12th Ave	77%	14%	28%	X	21%
SE 17th Ave	82%	50%	37%	X	47%
SE Ladd Ave/SE 20th Ave	67%	26%	X	64%	63%
SE 21st Ave	76%	1%	46%	X	57%
SE 26th Ave	79%	48%	45%	79%	47%

Table 4 Reserve Capacity during Weekday p.m. Peak Hour (with Existing Lanes and Signal Timing)

Intersection with SE Division St	Reserve Capacity (%) Under Existing Characteristics				
	EB	WB	NB	SB	OV
SE 11th Ave	34%	45%	X	15%	31%
SE 12th Ave	53%	58%	32%	X	43%
SE 17th Ave	63%	77%	74%	X	64%
SE Ladd Ave/SE 20th Ave	30%	45%	X	29%	30%
SE 21st Ave	54%	37%	26%	X	43%
SE 26th Ave	53%	60%	43%	71%	50%

As shown in Tables 3 and 4, all movements and all intersections are currently operating with additional capacity during the mid-week weekday a.m. and p.m. peak hours.

Proposed Characteristics (One Lane in Each Direction)

The urban design team is proposing that SE Division be modified to one lane in each direction within the study area. This proposal was evaluated assuming the existing signal timings remain in place and also assuming optimized timing occurs in the corridor. This two-step process alters one variable at a time; number of lanes first, then green time reallocation. The following subsections summarize the results.

Existing Signal Timings

Tables 5 and 6 summarize the results of the analysis for ***existing signal timings*** at the study intersections. The results of the proposed 2-lane configurations are listed alongside the results previously reported for the existing 4-lane configurations.

Table 5 Comparison of Delay/LOS during Existing and Proposed Scenarios for Weekday a.m. Peak Hour with Existing Signal Timing

Intersection with SE Division St	Delay (sec) & LOS Under Existing Characteristics (4 Lanes and Existing Signal Timing)					Delay (sec) & LOS Under Proposed Characteristics (2 Lanes and Existing Signal Timing)				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	23.9 C	15.7 B	X	21.4 C	18.8 B	16.2 B	123.4 F	X	28.3 C	77.2 E
SE 12th Ave	8.3 A	12.1 B	20.9 C	X	15.8 B	16.0 B	173.0 F	21.0 C	X	92.4 F
SE 17th Ave	2.0 A	2.9 A	29.8 C	X	7.4 A	2.0 A	5.5 A	30.6 C	X	9.3 A
SE Ladd Ave/ SE 20th Ave	17.4 B	8.6 A	X	22.9 C	12.0 B	19.9 B	73.8 E	X	22.9 C	60.1 E
SE 21st Ave	0.9 A	51.8 D	37.3 D	X	38.6 D	0.9 A	234.0 F	38.4 D	X	160.5 F
SE 26th Ave	4.2 A	6.9 A	28.1 C	21.8 B	11.3 B	4.4 A	10.6 B	28.8 C	22.0 C	13.5 B

EB: Eastbound Approach
WB: Westbound Approach
NB: Northbound Approach
SB: Southbound Approach
OV: Overall Intersection
X: Movement does not exist

As can be seen in Table 5, the intersections of SE 11th Avenue, SE 12th Avenue, and SE 21st Avenue are expected to fail (with a LOS F) under the configuration with only one lane in each direction on SE Division Street.

Table 6 Comparison of Delay/LOS during Existing and Proposed Weekday p.m. Peak Hour with Existing Signal Timing

Intersection with SE Division St	Delay (sec) & LOS Under Existing Characteristics (4 Lanes and Existing Signal Timing)					Delay (sec) & LOS Under Proposed Characteristics (2 Lanes and Existing Signal Timing)				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	21.2 C	14.3 B	X	28.2 C	23.8 C	24.1 C	27.0 C	X	28.3 C	26.7 C
SE 12th Ave	9.2 A	7.8 A	19.4 B	X	13.6 B	21.1 C	8.6 A	16.4 B	X	16.6 B
SE 17th Ave	1.4 A	1.4 A	30.8 D	X	2.9 A	3.2 A	1.6 A	31.6 C	X	4.2 A
SE Ladd Ave/ SE 20th Ave	13.7 B	4.0 A	X	35.0 C	16.5 B	51.0 D	3.5 A	X	35.0 C	32.4 C
SE 21st Ave	1.0 A	19.1 B	42.9 D	X	11.1 B	3.8 A	19.1 B	59.3 E	X	14.9 B
SE 26th Ave	4.5 A	2.3 A	28.4 C	22.9 C	9.5 A	11.5 B	3.2 A	29.7 C	23.2 C	13.0 B

As shown in Table 6, all of the intersections are forecast to operate at a level-of-service "C" or better during the weekday p.m. peak hour with only one lane in each direction.

Reserve Capacity

Tables 7 and 8 list the reserve capacities of the study intersections under proposed characteristics with ***existing signal timings.***

Table 7 Comparison of Reserve Capacity. Existing 4-Lanes and Proposed 2-Lanes. Weekday a.m. Peak Hour with Existing Signal Timing

Intersection with SE Division St	Reserve Capacity (%) Under Existing Characteristics					Reserve Capacity (%) Under Proposed Characteristics – Existing Signal Timing				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	51%	12%	X	48%	26%	54%	-25%	X	33%	-7%
SE 12th Ave	77%	14%	28%	X	21%	65%	-35%	28%	X	-6%
SE 17th Ave	82%	50%	37%	X	47%	81%	27%	36%	X	29%
SE Ladd Ave/ SE 20th Ave	67%	26%	X	64%	63%	55%	-13%	X	64%	15%
SE 21st Ave	76%	1%	46%	X	57%	76%	-46%	43%	X	24%
SE 26th Ave	79%	48%	45%	79%	47%	75%	24%	43%	77%	29%

Concurrent with the level-of-service results in Table 5, the westbound approaches at the intersections of SE 11th Avenue, SE 12th Avenue, 7 Corners, and SE 26th Avenues do not have sufficient capacity to operate with one lane in each direction. In addition, the westbound direction at the intersection of SE 26th Avenue & SE Division would be expected to operate at capacity without special signal timing provisions.

Table 8 Comparison of Reserve Capacity. Existing 4-Lanes and Proposed 2-Lanes Weekday p.m. Peak Hour with Existing Signal Timing

Intersection with SE Division St	Reserve Capacity (%) Under Existing Characteristics					Reserve Capacity (%) Under Proposed Characteristics				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	34%	45%	X	15%	31%	24%	23%	X	15%	22%
SE 12th Ave	53%	58%	32%	X	43%	14%	54%	45%	X	29%
SE 17th Ave	63%	77%	74%	X	64%	40%	77%	65%	X	42%
SE Ladd Ave/ SE 20th Ave	30%	45%	X	29%	30%	-2%	45%	X	25%	14%
SE 21st Ave	54%	37%	26%	X	43%	30%	38%	13%	X	27%
SE 26th Ave	53%	60%	43%	71%	50%	26%	51%	39%	69%	29%

Concurrent with the level-of-service results, all intersections are forecast to have some amount of residual capacity during the weekday p.m. peak hour. The eastbound direction at the 7 Corners intersection is expected to operate at capacity without special signal timing provisions.

Optimized Signal Timings

Tables 9 and 10 display the results for one lane scenario with the ***signal timings optimized*** using Synchro. The purpose of investigating this scenario was to determine to what degree adjustments to the existing signal timing would result in more satisfactory performances.

Table 9 Comparison of Peak Hour Delay/LOS. Proposed 2-Lanes with Existing Timing and Proposed 2-Lanes with Optimized Signal Timing. Weekday a.m. Peak Hour.

Intersection with SE Division St	Delay (sec) & LOS Under Proposed Characteristics (2 Lanes and Existing Signal Timing)					Delay (sec) & LOS Under Optimized Proposed Characteristics (2 Lanes and Optimized Signal Timing)				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	16.2 B	123.4 F	X	28.3 C	77.2 E	5.9 A	110.2 F	X	30.4 C	69.2 E
SE 12th Ave	16.0 B	173.0 F	21.0 C	X	92.4 F	6.5 A	51.0 D	71.2 E	X	56.8 E
SE 17th Ave	2.0 A	5.5 A	30.6 C	X	9.3 A	2.0 A	5.5 A	30.6 C	X	9.3 A
SE Ladd Ave/ SE 20th Ave	19.9 B	73.8 E	X	22.9 C	60.1 E	18.1 B	33.0 C	X	25.1 C	30.3 C
SE 21st Ave	0.9 A	234.0 F	38.4 D	X	160.5 F	2.0 A	156.0 F	38.4 D	X	108.5 F
SE 26th Ave	4.4 A	10.6 B	28.8 C	22.0 C	13.5 B	3.1 A	9.5 A	32.3 D	23.5 C	13.5 B

As shown in Table 9, even with optimization of signal timings the westbound approaches at SE 11th Avenue and at 7 Corners intersections will continue to operate at a level-of-service "F" during the weekday a.m. peak hour.

Table 10 Comparison of Peak Hour Delay/LOS. Proposed 2-Lanes with Existing Timing and Proposed 2-Lanes with Optimized Signal Timing. Weekday p.m. Peak Hour.

Intersection with SE Division St	Delay (sec) & LOS Under Proposed Characteristics (2 Lanes and Existing Signal Timing)					Delay (sec) & LOS Under Optimized Proposed Characteristics (2 Lanes and Optimized Signal Timing)				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	24.1 C	27.0 C	X	28.3 C	26.7 C	13.5 B	28.2 C	X	25.8 C	21.8 C
SE 12th Ave	21.1 C	8.6 A	16.4 B	X	16.6 B	10.1 B	3.0 A	26.2 C	X	16.1 B
SE 17th Ave	3.2 A	1.6 A	31.6 C	X	4.2 A	2.6 A	2.1 A	31.6 C	X	3.9 A
SE Ladd Ave/ SE 20th Ave	51.0 D	3.5 A	X	35.0 C	32.4 C	51.0 D	3.5 A	X	35.0 D	32.4 D
SE 21st Ave	3.8 A	19.1 B	59.3 E	X	14.9 B	3.8 A	19.1 B	59.3 E	X	14.9 B
SE 26th Ave	11.5 B	3.2 A	29.7 C	23.2 C	13.0 B	9.7 A	3.5 A	33.6 D	24.9 C	13.1 B

Optimization of signal timings during the weekday p.m. peak hour shows little to no benefit at the Division Street intersections due to the fact that the intersections are already operating at a level-of-service "C" or better and under capacity.

Reserve Capacity

Tables 11 and 12 show the reserve capacities of the study intersections with one lane in each direction on Division Street and ***optimized traffic signal timings.***

Table 11 Comparison of Peak Hour Reserve Capacity. Proposed 2-Lanes with Existing Timing and Proposed 2-Lanes with Optimized Signal Timing. Weekday a.m. Peak Hour.

Intersection with SE Division St	Reserve Capacity (%) Under Proposed Characteristics (2 Lanes and Existing Signal Timing)					Reserve Capacity (%) Under Optimized Proposed Characteristics (2 Lanes and Optimized Signal Timing)				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	54%	-25%	X	33%	-7%	70%	-22%	X	28%	-9%
SE 12th Ave	65%	-35%	28%	X	-6%	80%	-7%	-6%	X	-6%
SE 17th Ave	81%	27%	36%	X	29%	81%	27%	33%	X	29%
SE Ladd Ave/ SE 20th Ave	55%	-13%	X	64%	15%	70%	-4%	X	59%	15%
SE 21st Ave	76%	-46%	43%	X	24%	76%	-25%	43%	X	25%
SE 26th Ave	75%	24%	43%	77%	29%	76%	26%	37%	75%	29%

The results show that even the subsequent optimization of signal timings will not be enough to make all the intersections operate below capacity. The intersections of SE 11th Avenue & SE Division Street, SE 12th Avenue & SE Division Street are forecast to have insufficient capacity to operate with one lane in each direction during the weekday a.m. peak hour. Also, the westbound movement at the 7 Corners intersection is expected not to have sufficient capacity unless a special signal timing strategy is used to provide additional green time for the westbound direction.

Table 12 Comparison of Peak Hour Reserve Capacity. Proposed 2-Lanes with Existing Timing and Proposed 2-Lanes with Optimized Signal Timing. Weekday p .m. Peak Hour.

Intersection with SE Division St	Reserve Capacity (%) Under Existing Signal Timing					Reserve Capacity (%) Under Optimized Signal Timing				
	EB	WB	NB	SB	OV	EB	WB	NB	SB	OV
SE 11th Ave	24%	23%	X	15%	22%	43%	25%	X	18%	22%
SE 12th Ave	14%	54%	45%	X	29%	32%	63%	25%	X	29%
SE 17th Ave	40%	77%	65%	X	42%	40%	67%	65%	X	42%
SE Ladd Ave/ SE 20th Ave	-2%	45%	X	25%	14%	-2%	45%	X	25%	14%
SE 21st Ave	30%	38%	13%	X	27%	30%	38%	13%	X	27%
SE 26th Ave	26%	51%	39%	69%	29%	26%	51%	39%	69%	29%

According to the results of the Synchro analysis, all intersections are forecast to have some amount of residual capacity during the weekday p.m. peak hour. The eastbound movement at the 7 Corners intersection is expected to approach capacity and careful consideration should be given as to whether this movement could be served with only one lane.

CONCLUSIONS AND RECOMMENDATIONS

It has been determined that the following intersections have sufficient capacity to meet the City's level-of-service standards with one lane in each direction of SE Division Street:

- SE 17th Avenue & SE Division Street,
- SE 26th Avenue & SE Division Street, and

It is recommended that the following intersections be studied further to determine if lane configurations other than the existing four-lane striping would adequately serve the area's transportation needs.

- SE 11th Avenue & SE Division Street,
- SE 12th Avenue & SE Division Street,
- SE 20th Avenue/Ladd Street & SE Division Street,
- SE 21st Avenue & SE Division Street, and

} 7 Corners

Please contact us at (503) 228-5230 with any questions about this memorandum.

Appendix A: Site Visit Observations

Appendix B: Level-of-Service Explanation

Appendix C: Synchro Analysis - Existing Conditions

Appendix D: Synchro Analysis - Proposed Conditions with Existing Signal Timing

Appendix E: Synchro Analysis - Proposed Conditions with Optimized Signal Timing

Appendix A
Site Visit Observations

Appendix A Site Visit Observations

Wednesday June 10, 2009

The following intersections were visited during the a.m. and p.m. peak periods:

1. SE 12th Avenue & SE Division Street
2. SE 20th Avenue/21st Avenue/Ladd Street & SE Division Street
3. SE 26th Avenue & SE Division Street

SE 12th Avenue & SE Division Street

Morning Peak Period - Westbound Movement

1. Majority of the westbound vehicles used the inner lane approaching SE 12th Avenue/SE Division St intersection. These vehicles then made a left turn at SE 11th Avenue/SE Division Street suggesting that the drivers try to position themselves at SE 12th Avenue in order to make a left turn at 11th Avenue.

2. Almost all the cycles had a westbound queue which spilled back to other intersections to the east (SE 13th and SE 14th). However, there was no traffic entering Division Street from these cross streets.

3. There were a few cycles when the westbound left turning queue on SE 11th Avenue spilled back to SE 12th Avenue/SE Division Street intersection affecting the operations of the intersection. This prevented the through traffic from entering the intersection even if the movement had a green light.

4. The block between SE 11th Avenue and SE 12th Avenue can accommodate up to 7 cars in a lane on average.

5. The lanes on Division Street are narrow. The buses and occasional heavy vehicles occupy and block both the lanes when operating on Division Street.

6. The westbound bus operations at the bus stop between SE 12th and SE 11th Avenue interfere with the traffic flow on Division Street. It was observed that the bus operators, when leaving the bus stop, tend to move to the inner lane rather than continue in the outer lane. As a result, the drivers wanting to enter the intersection of SE Division Street/SE 12th Avenue cannot do so.

Conclusion:

Field observations of the traffic condition during the morning commute period indicate that it will not be advisable to reduce the westbound section to a single lane. Moving the bus stop located between 11th and 12th Avenue to the west beyond 11th Avenue should be explored. While this could help minimize the impact of bus operations on traffic, it could inconvenience bus patrons.

Evening Peak Period - Eastbound Movement

1. More than 90% of the traffic used the inner lane. Most of the vehicles continued straight on Division with very few making a left turn on to SE 12th Avenue.

2. There were very few cycles when an eastbound queue was formed. For a majority of the signal cycles, there was always enough green time for all the vehicles approaching the intersection to get through with some residual capacity to accommodate a few more.

3. The outer lane carried very few vehicles, majority of them being buses stopping at the bus stop between SE 11th Avenue and SE 12th Avenue.

Conclusion:

Field observations suggest that reducing the eastbound two way section to a single lane shall not result in major traffic concerns. It should however be noted that if a lane is dropped, the buses stopping at the bus stop (which stop in the minimally used outer lane today) will interfere with the traffic operations causing some cycles to fail. Under such a scenario, it would be suggested to provide a far side bus bay where passengers can board and alight the bus without interfering with the traffic.

SE 20th Avenue/21st Avenue/Ladd Street & SE Division Street

Morning Peak Period - Westbound Movement: During the morning peak traffic period, the westbound approach of Division Street at the intersection known as "Seven Corners" was observed for 45 minutes between 7:45 am to 8:30 am.

1. The vehicular flow at this approach tends to use the inside lane (left lane from driver's perspective) more often. Based on counts made during the observation period the inside lane is used by 64% of the drivers while the outside lane is used by 36%.

2. Drivers who arrive during the red light queue up in the inside lane. Drivers tend to begin using the outside lane when its queue is five or more vehicles shorter than the inside lane's queue.

3. Queues formed during the red light are usually served during the next green light. Vehicles waiting a second cycle are a very rare occurrence.

4. Bicyclists crossing Division Street from 21st have to rely on a motor vehicle to receive a green light. 21st Avenue's signal turns green when activated by a motor vehicle that queues on a loop detector.

Conclusion:

It is not advisable to reduce the westbound approach to a single lane configuration. Drivers prefer to use the inside lane; however due to the high volumes the lane utilization becomes similar once the queues are formed.

Evening Peak Period - Eastbound Movement: During the afternoon peak traffic period, the eastbound approach of Division Street at Seven Corners was observed for 45 min between 4:45 pm and 5:30 pm.

1. The eastbound approach is extremely complicated. Eastbound vehicles queuing at this approach often block the access to 20th Ave (south leg) or to the adjacent grocery store parking lot driveway. This complicates a driver's ability to turn left to or from Division Street.

2. On occasion drivers turning left onto Division Street block the entire eastbound approach while they wait for a gap in westbound traffic. In some cases this waiting took the entire phase.

3. When a bus occupies the eastbound bus stop between 19th and 20th (south leg) Avenues, queues in the inside lane get longer than usual. Some drivers maneuver back into the outside lane after passing a stopped bus.

4. An average of 11 (70%) eastbound motor vehicles per cycle used the inside lane while 5 (30%) used the outside lane.

Conclusion:

The interaction between the unsignalized intersection at Division St. and 20th avenue (south leg) and the signalized at Division St. and Ladd St./20th Avenue (north leg) generates a specially complicated setup for queuing, technically the queue formed at the signalized intersection spills back to the unsignalized. It is not recommended to reduce this approach (eastbound) to a single lane given the complexity and the space required to make the different movement that this approach serves.

SE 26th Avenue & SE Division Street

Morning Peak Period - Westbound Movement

1. The majority of the westbound vehicles used the inner lane when approaching the SE 26th Avenue/SE Division St intersection. No more than 5 vehicles used the outside curb during any one green phase.

2. With the existing signal timing, and assuming no left-turning vehicles, the westbound capacity for a single lane was estimated to be 17 to 19 vehicles per green phase. This was observed to occur 5 times during the morning peak. In all but one case, no vehicles were observed using the outside lane because traffic arrived at the beginning of the green and did not have to queue at a red light.

3. The ratio of vehicles in the inside lane to vehicles in the outside lane averaged 5-to-1.

4. The sum of the volumes in both lanes very rarely exceeded 17 vehicles per green phase.

5. In 6 out of 30 observed signal cycles, there were drivers who had to wait a second cycle before proceeding. This never occurred in consecutive cycles.

6. On a few occasions westbound drivers were delay by westbound left-turning vehicles. In most cases, drivers maneuvered around the left-turn and proceeded without delay.

Conclusion:

Field observations of the traffic condition during the morning peak traffic period indicate that traffic could operate at an acceptable level if Division Street had one lane in each direction. Some consideration should be given to providing a way for westbound through traffic to maneuver around delayed left-turning vehicles.

Evening Peak Period - Eastbound Movement

1. The majority of the eastbound vehicles used the inner lane when approaching the SE 26th Avenue/SE Division St intersection. During the 32 signal cycles that were observed, only 50 drivers used the outside lane to approach the intersection. Only 16 of those drivers actually made through moves. The other 34 drivers turned right to go south on 26th Avenue.

2. With the existing signal timing, and assuming no left-turning vehicles, the westbound capacity for a single lane was estimated to be 17 to 19 vehicles per green phase. This was observed to occur 6 times during the afternoon peak. In all but 2 cases, no vehicles were observed using the outside lane to make a through move across the intersection.

3. The ratio of vehicles in the inside lane to vehicles using the outside lane to make a through move averaged 24-to-1.

4. In no case were there Division Street drivers who had to wait a second cycle before proceeding. Eastbound capacity always exceeded demand.

5. During the peak 30 minutes, northbound traffic demand was observed to consistently exceed the capacity of the green time allocated to 26th Avenue. The average capacity for the northbound approach was 6 vehicles per green phase. The demand per green phase ranged from 8 to 14.

6. A significant amount of pedestrian activity was observed.

Conclusion:

Field observations suggest that it is feasible to reduce the eastbound two lane section to a single lane without compromising the performance of Division Street. Reallocating green time by reducing Division Street's green time and increasing 26th's should be explored.

Retaining a Right-Turn-Only lane should be explored. This retain current levels of performance and it would provide a way for right-turning drivers to yield to pedestrians without impeding eastbound through traffic.

Appendix B
Level-of-Service Explanation

Appendix B Level-of-Service Concept

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from "A" to "F".1

SIGNALIZED INTERSECTIONS

The six level-of-service grades are described qualitatively for signalized intersections in Table B1. Additionally, Table B2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service "D" is generally considered to represent the minimum acceptable design standard.

Table B-1 Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

1 Most of the material in this appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Table B2 Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2000 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table B3. A quantitative definition of level of service for unsignalized intersections is presented in Table B4. Using this definition, Level of Service "E" is generally considered to represent the minimum acceptable design standard.

Table B3 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

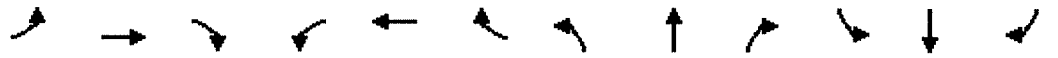
Table B4 Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Appendix C
Synchro Analysis
Existing Conditions



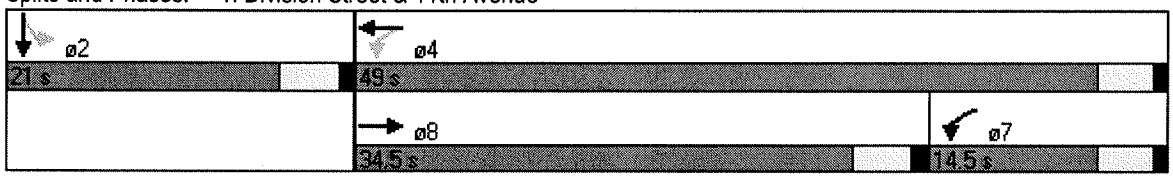
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	105	158	316	569	0	0	0	0	46	453	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	0.95	*0.75	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		0.99									1.00	
Frt		0.919									0.998	
Flt Protected					0.982						0.995	
Satd. Flow (prot)	0	1491	0	0	2479	0	0	0	0	0	3485	0
Flt Permitted					0.699						0.995	
Satd. Flow (perm)	0	1491	0	0	1764	0	0	0	0	0	3482	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		137									2	
Link Speed (mph)		25			20			25			25	
Link Distance (ft)		355			263			1501			1376	
Travel Time (s)		9.7			9.0			40.9			37.5	
Confl. Peds. (#/hr)			12			2				5		10
Confl. Bikes (#/hr)												
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	5	5	8	8	0	0	0	0	0	5	5
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	0	118	178	355	639	0	0	0	0	52	509	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	296	0	0	994	0	0	0	0	0	570	0
Turn Type				pm+pt						Perm		
Protected Phases		8		7	4						2	
Permitted Phases				4						2		
Detector Phase		8		7	4					2	2	
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0					10.0	10.0	
Minimum Split (s)		24.6		9.4	48.4					19.6	19.6	
Total Split (s)	0.0	34.5	0.0	14.5	49.0	0.0	0.0	0.0	0.0	21.0	21.0	0.0
Total Split (%)	0.0%	49.3%	0.0%	20.7%	70.0%	0.0%	0.0%	0.0%	0.0%	30.0%	30.0%	0.0%
Yellow Time (s)		3.6		3.4	3.4					3.6	3.6	
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	
Lost Time Adjust (s)	0.0	-0.5	0.0	-0.5	-0.5	0.0	0.0	0.0	0.0	-0.5	-0.5	0.0
Total Lost Time (s)	4.0	4.1	4.0	3.9	3.9	4.0	4.0	4.0	4.0	4.1	4.1	4.0
Lead/Lag		Lead		Lag								
Lead-Lag Optimize?		Yes		Yes								
Recall Mode		Max		Max	Max					C-Max	C-Max	
v/c Ratio		0.41			0.80						0.68	
Control Delay		9.0			13.6						28.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			2.7						0.0	
Total Delay		9.0			16.4						28.7	
Queue Length 50th (ft)		42			154						116	
Queue Length 95th (ft)		94			m170						166	
Internal Link Dist (ft)		275			183			1421			1296	
Turn Bay Length (ft)												
Base Capacity (vph)		725			1245						842	
Starvation Cap Reductn		0			151						0	
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.41			0.91						0.68	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 0 (0%), Referenced to phase 2:SBTL, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
* User Entered Value
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Division Street & 11th Avenue



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	105	158	316	569	0	0	0	0	46	453	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.1			3.9						4.1	
Lane Util. Factor		1.00			*0.75						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.92			1.00						1.00	
Flt Protected		1.00			0.98						1.00	
Satd. Flow (prot)		1490			2480						3482	
Flt Permitted		1.00			0.70						1.00	
Satd. Flow (perm)		1490			1763						3482	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	118	178	355	639	0	0	0	0	52	509	9
RTOR Reduction (vph)	0	78	0	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	218	0	0	994	0	0	0	0	0	568	0
Confl. Peds. (#/hr)			12			2				5		10
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	5	5	8	8	0	0	0	0	0	5	5
Turn Type				pm+pt						Perm		
Protected Phases		8		7	4						2	
Permitted Phases				4						2		
Actuated Green, G (s)		29.9			44.6						16.4	
Effective Green, g (s)		30.4			45.1						16.9	
Actuated g/C Ratio		0.43			0.64						0.24	
Clearance Time (s)		4.6			4.4						4.6	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		647			1244						841	
v/s Ratio Prot		0.15			c0.12							
v/s Ratio Perm					c0.39						0.16	
v/c Ratio		0.34			0.80						0.68	
Uniform Delay, d1		13.1			9.1						24.1	
Progression Factor		1.00			0.94						1.00	
Incremental Delay, d2		1.4			3.3						4.3	
Delay (s)		14.5			11.9						28.4	
Level of Service		B			B						C	
Approach Delay (s)		14.5			11.9			0.0			28.4	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

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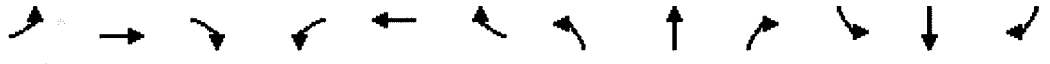


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	141	0	0	706	238	179	695	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	*0.75	0.95	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor					0.99			0.99				
Frt					0.962			0.995				
Flt Protected		0.997						0.990				
Satd. Flow (prot)	0	1649	0	0	2412	0	0	3476	0	0	0	0
Flt Permitted		0.909						0.990				
Satd. Flow (perm)	0	1503	0	0	2412	0	0	3460	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					61			6				
Link Speed (mph)		25			20			25			25	
Link Distance (ft)		263			461			1504			1317	
Travel Time (s)		7.2			15.7			41.0			35.9	
Confl. Peds. (#/hr)			8			8	19		7			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	20%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	0	0	8	8	0	5	5	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	11	155	0	0	776	262	197	764	34	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	166	0	0	1038	0	0	995	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Detector Phase	2	2			2		4	4				
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0		10.0	10.0				
Minimum Split (s)	16.4	16.4			16.4		21.4	21.4				
Total Split (s)	38.0	38.0	0.0	0.0	38.0	0.0	32.0	32.0	0.0	0.0	0.0	0.0
Total Split (%)	54.3%	54.3%	0.0%	0.0%	54.3%	0.0%	45.7%	45.7%	0.0%	0.0%	0.0%	0.0%
Yellow Time (s)	3.4	3.4			3.4		3.4	3.4				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-0.5	0.0	-0.5	-0.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.9	3.9	4.0	4.0	3.9	4.0	3.9	3.9	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max			C-Max		Max	Max				
v/c Ratio		0.23			0.86			0.71				
Control Delay		13.9			13.1			21.0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay		0.0			0.0			0.0				
Total Delay		13.9			13.1			21.0				
Queue Length 50th (ft)		58			60			182				
Queue Length 95th (ft)		m101			#97			248				
Internal Link Dist (ft)		183			381			1424			1237	
Turn Bay Length (ft)												
Base Capacity (vph)		732			1206			1393				
Starvation Cap Reductn		0			0			0				
Spillback Cap Reductn		0			0			5				
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.23			0.86			0.72				

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 53.1 (76%), Referenced to phase 2:EBWB, Start of Yellow	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	

* User Entered Value
\# 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: 2: Division Street & 12th Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	141	0	0	706	238	179	695	31	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		3.9			3.9			3.9				
Lane Util. Factor		1.00			*0.75			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.96			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		1648			2413			3460				
Flt Permitted		0.91			1.00			0.99				
Satd. Flow (perm)		1504			2413			3460				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	155	0	0	776	262	197	764	34	0	0	0
RTOR Reduction (vph)	0	0	0	0	31	0	0	4	0	0	0	0
Lane Group Flow (vph)	0	166	0	0	1007	0	0	991	0	0	0	0
Confl. Peds. (#/hr)			8			8	19		7			
Heavy Vehicles (%)	20%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	0	0	8	8	0	5	5	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		33.6			33.6			27.6				
Effective Green, g (s)		34.1			34.1			28.1				
Actuated g/C Ratio		0.49			0.49			0.40				
Clearance Time (s)		4.4			4.4			4.4				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		733			1175			1389				
v/s Ratio Prot					c0.42							
v/s Ratio Perm		0.11						0.29				
v/c Ratio		0.23			0.86			0.71				
Uniform Delay, d1		10.3			15.8			17.6				
Progression Factor		1.24			0.30			1.00				
Incremental Delay, d2		0.6			7.2			3.2				
Delay (s)		13.5			11.9			20.7				
Level of Service		B			B			C				
Approach Delay (s)		13.5			11.9			20.7			0.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	147	25	6	761	183	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	0.95	*0.75	1.00	1.00
Ped Bike Factor	1.00				1.00	
Frt	0.981				0.992	
Flt Protected					0.955	
Satd. Flow (prot)	1408	0	0	2524	1796	0
Flt Permitted				0.953	0.955	
Satd. Flow (perm)	1408	0	0	2405	1796	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	26				4	
Link Speed (mph)	25			20	25	
Link Distance (ft)	835			759	403	
Travel Time (s)	22.8			25.9	11.0	
Confl. Peds. (#/hr)		4				9
Confl. Bikes (#/hr)						
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Parking (#/hr)	5	5				
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	162	27	7	836	201	13
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	0	0	843	214	0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Detector Phase	2		2	2	4	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	16.5		16.5	16.5	19.0	
Total Split (s)	50.5	0.0	50.5	50.5	19.5	0.0
Total Split (%)	72.1%	0.0%	72.1%	72.1%	27.9%	0.0%
Yellow Time (s)	3.5		3.5	3.5	3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	-0.5	0.0	-0.5	-0.5	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max		C-Max	C-Max	None	
v/c Ratio	0.19			0.50	0.63	
Control Delay	2.0			3.0	34.1	

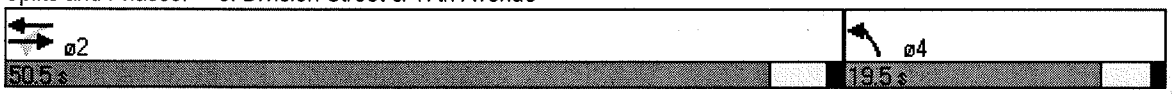
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Delay	0.0			0.0	0.0	
Total Delay	2.0			3.0	34.1	
Queue Length 50th (ft)	10			18	84	
Queue Length 95th (ft)	m16			136	144	
Internal Link Dist (ft)	755			679	323	
Turn Bay Length (ft)						
Base Capacity (vph)	991			1680	401	
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.19			0.50	0.53	

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 23 (33%), Referenced to phase 2:EBWB, Start of Yellow	
Natural Cycle: 45	
Control Type: Actuated-Coordinated	

* User Entered Value

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

Splits and Phases: 3: Division Street & 17th Avenue



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	147	25	6	761	183	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			*0.75	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1407			2523	1795	
Flt Permitted	1.00			0.95	0.96	
Satd. Flow (perm)	1407			2406	1795	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	162	27	7	836	201	13
RTOR Reduction (vph)	8	0	0	0	3	0
Lane Group Flow (vph)	181	0	0	843	211	0
Confl. Peds. (#/hr)		4				9
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Parking (#/hr)	5	5				
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	48.4			48.4	13.1	
Effective Green, g (s)	48.9			48.9	13.1	
Actuated g/C Ratio	0.70			0.70	0.19	
Clearance Time (s)	4.5			4.5	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	983			1681	336	
v/s Ratio Prot	0.13				c0.12	
v/s Ratio Perm				c0.35		
v/c Ratio	0.18			0.50	0.63	
Uniform Delay, d1	3.6			4.9	26.2	
Progression Factor	0.44			0.41	1.00	
Incremental Delay, d2	0.4			0.8	3.6	
Delay (s)	2.0			2.8	29.8	
Level of Service	A			A	C	
Approach Delay (s)	2.0			2.8	29.8	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	150	9	10	758	9	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)		0	0		0	0
Storage Lanes		0	0		1	0
Taper Length (ft)		25	25		25	25
Lane Util. Factor	1.00	1.00	0.95	*0.75	1.00	1.00
Ped Bike Factor						
Frt	0.992				0.969	
Flt Protected				0.999	0.963	
Satd. Flow (prot)	1402	0	0	2521	1773	0
Flt Permitted				0.999	0.963	
Satd. Flow (perm)	1402	0	0	2521	1773	0
Link Speed (mph)	25			20	25	
Link Distance (ft)	759			148	497	
Travel Time (s)	20.7			5.0	13.6	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Parking (#/hr)	5	5				
Mid-Block Traffic (%)	0%			0%	0%	
Adj. Flow (vph)	167	10	11	842	10	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	177	0	0	853	13	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
* User Entered Value	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	150	9	10	758	9	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	167	10	11	842	10	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	759			148		
pX, platoon unblocked					0.82	
vC, conflicting volume			177		615	172
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			177		102	172
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		99	100
cM capacity (veh/h)			1412		728	848

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	177	292	561	13
Volume Left	0	11	0	10
Volume Right	10	0	0	3
cSH	1700	1412	1700	755
Volume to Capacity	0.10	0.01	0.33	0.02
Queue Length 95th (ft)	0	1	0	1
Control Delay (s)	0.0	0.4	0.0	9.9
Lane LOS		A		A
Approach Delay (s)	0.0	0.1		9.9
Approach LOS				A

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

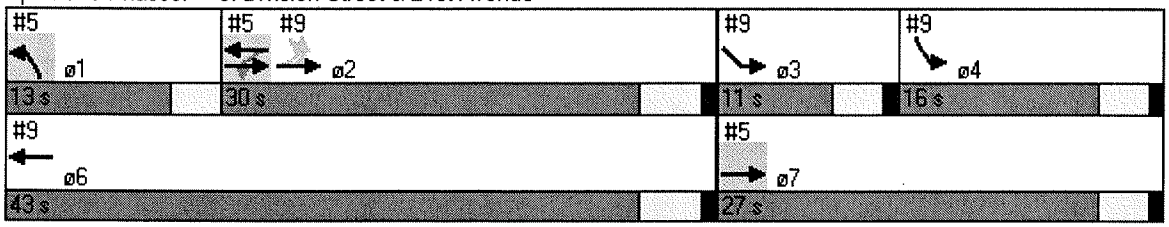
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3	ø4	ø6	ø7
Lane Configurations										
Volume (vph)	185	84	12	768	108	13				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	9	9	9	9	12	12				
Grade (%)	0%			0%	0%					
Storage Length (ft)		0	0		0	0				
Storage Lanes		0	0		1	0				
Taper Length (ft)		25	25		25	25				
Lane Util. Factor	1.00	1.00	0.95	*0.75	1.00	1.00				
Ped Bike Factor										
Frt	0.958				0.985					
Flt Protected				0.999	0.957					
Satd. Flow (prot)	1569	0	0	2521	1791	0				
Flt Permitted				0.949	0.957					
Satd. Flow (perm)	1569	0	0	2395	1791	0				
Right Turn on Red		No				Yes				
Satd. Flow (RTOR)					7					
Link Speed (mph)	25			20	25					
Link Distance (ft)	129			1277	514					
Travel Time (s)	3.5			43.5	14.0					
Confl. Peds. (#/hr)										
Confl. Bikes (#/hr)										
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93				
Growth Factor	100%	100%	100%	100%	100%	100%				
Heavy Vehicles (%)	2%	3%	0%	0%	0%	0%				
Bus Blockages (#/hr)	5	5	8	8	0	0				
Parking (#/hr)										
Mid-Block Traffic (%)	0%			0%	0%					
Adj. Flow (vph)	199	90	13	826	116	14				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	289	0	0	839	130	0				
Turn Type			Perm							
Protected Phases	2 7			2	1		3	4	6	7
Permitted Phases			2							
Detector Phase	2 7		2	2	1					
Switch Phase										
Minimum Initial (s)			20.0	20.0	3.0		3.0	3.0	20.0	3.0
Minimum Split (s)			28.0	28.0	13.0		15.0	7.0	28.0	12.0
Total Split (s)	57.0	0.0	30.0	30.0	13.0	0.0	11.0	16.0	43.0	27.0
Total Split (%)	81.4%	0.0%	42.9%	42.9%	18.6%	0.0%	16%	23%	61%	39%
Yellow Time (s)			3.7	3.7	3.0		3.0	3.0	3.7	3.0
All-Red Time (s)			1.0	1.0	0.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	0.0	-1.0	-1.0	1.0	0.0				
Total Lost Time (s)	3.7	4.0	3.7	3.7	4.0	4.0				
Lead/Lag			Lag	Lag	Lead		Lead	Lag		
Lead-Lag Optimize?			Yes	Yes	Yes		Yes	Yes		
Recall Mode			C-Max	C-Max	Max		None	None	Max	Max
v/c Ratio	0.24			0.93	0.55					
Control Delay	0.9			37.4	36.7					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3	ø4	ø6	ø7
Queue Delay	0.8			10.3	0.0					
Total Delay	1.7			47.7	36.7					
Queue Length 50th (ft)	2			204	50					
Queue Length 95th (ft)	9			#373	#104					
Internal Link Dist (ft)	49			1197	434					
Turn Bay Length (ft)										
Base Capacity (vph)	1195			900	236					
Starvation Cap Reductn	626			0	0					
Spillback Cap Reductn	0			61	1					
Storage Cap Reductn	0			0	0					
Reduced v/c Ratio	0.51			1.00	0.55					

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 47.3 (68%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Division Street & 21st Avenue



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	185	84	12	768	108	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	3.7			3.7	4.0	
Lane Util. Factor	1.00			*0.75	1.00	
Frt	0.96			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1569			2522	1792	
Flt Permitted	1.00			0.95	0.96	
Satd. Flow (perm)	1569			2395	1792	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	199	90	13	826	116	14
RTOR Reduction (vph)	0	0	0	0	6	0
Lane Group Flow (vph)	289	0	0	839	124	0
Heavy Vehicles (%)	2%	3%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Turn Type			Perm			
Protected Phases	2 7			2	1	
Permitted Phases			2			
Actuated Green, G (s)	53.0			23.7	10.0	
Effective Green, g (s)	54.0			24.7	9.0	
Actuated g/C Ratio	0.77			0.35	0.13	
Clearance Time (s)				4.7	3.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)	1210			845	230	
v/s Ratio Prot	c0.18				c0.07	
v/s Ratio Perm				c0.35		
v/c Ratio	0.24			0.99	0.54	
Uniform Delay, d1	2.2			22.6	28.6	
Progression Factor	0.18			0.93	1.00	
Incremental Delay, d2	0.4			27.3	8.8	
Delay (s)	0.8			48.2	37.3	
Level of Service	A			D	D	
Approach Delay (s)	0.8			48.2	37.3	
Approach LOS	A			D	D	

Intersection Summary			
HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.7
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	150	40	47	676	12	90	91	31	7	77	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	25		0	25		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	0.95	*0.75	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98			1.00			0.99			1.00	
Frt		0.969			0.997			0.980			0.980	
Flt Protected	0.950				0.997			0.979			0.997	
Satd. Flow (prot)	1433	1372	0	0	2505	0	0	1813	0	0	1851	0
Flt Permitted	0.251				0.925			0.856			0.979	
Satd. Flow (perm)	379	1372	0	0	2325	0	0	1585	0	0	1817	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			4			12			12	
Link Speed (mph)		25			20			25			25	
Link Distance (ft)		1277			503			614			479	
Travel Time (s)		34.8			17.1			16.7			13.1	
Confl. Peds. (#/hr)			23			19			7			7
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	8	158	42	49	712	13	95	96	33	7	81	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	8	200	0	0	774	0	0	224	0	0	103	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.5	15.5		15.5	15.5		19.0	19.0		19.0	19.0	
Total Split (s)	48.5	48.5	0.0	48.5	48.5	0.0	21.5	21.5	0.0	21.5	21.5	0.0
Total Split (%)	69.3%	69.3%	0.0%	69.3%	69.3%	0.0%	30.7%	30.7%	0.0%	30.7%	30.7%	0.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-0.5	-0.5	0.0	-0.5	-0.5	0.0	-0.5	-0.5	0.0	-0.5	-0.5	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
v/c Ratio	0.03	0.23			0.52			0.54			0.22	
Control Delay	4.1	3.7			7.1			26.8			19.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0			0.0			0.0			0.0	
Total Delay	4.1	3.7			7.1			26.8			19.6	
Queue Length 50th (ft)	1	22			78			78			31	
Queue Length 95th (ft)	m4	21			m128			144			67	
Internal Link Dist (ft)		1197			423			534			399	
Turn Bay Length (ft)	25											
Base Capacity (vph)	241	886			1479			416			476	
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	0.03	0.23			0.52			0.54			0.22	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 22 (31%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated
* User Entered Value
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Division Street & 26th Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	8	150	40	47	676	12	90	91	31	7	77	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0			4.0			3.5			3.5	
Lane Util. Factor	1.00	1.00			*0.75			1.00			1.00	
Frpb, ped/bikes	1.00	0.98			1.00			0.99			1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	
Frt	1.00	0.97			1.00			0.98			0.98	
Flt Protected	0.95	1.00			1.00			0.98			1.00	
Satd. Flow (prot)	1433	1371			2506			1814			1850	
Flt Permitted	0.25	1.00			0.93			0.86			0.98	
Satd. Flow (perm)	379	1371			2326			1585			1818	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	158	42	49	712	13	95	96	33	7	81	15
RTOR Reduction (vph)	0	14	0	0	1	0	0	9	0	0	9	0
Lane Group Flow (vph)	8	186	0	0	773	0	0	215	0	0	94	0
Confl. Peds. (#/hr)			23			19			7			7
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	44.0	44.0			44.0			17.5			17.5	
Effective Green, g (s)	44.5	44.5			44.5			18.0			18.0	
Actuated g/C Ratio	0.64	0.64			0.64			0.26			0.26	
Clearance Time (s)	4.5	4.5			4.5			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	241	872			1479			408			467	
v/s Ratio Prot		0.14										
v/s Ratio Perm	0.02				c0.33			c0.14			0.05	
v/c Ratio	0.03	0.21			0.52			0.53			0.20	
Uniform Delay, d1	4.7	5.4			7.0			22.3			20.4	
Progression Factor	0.77	0.69			0.86			1.00			1.00	
Incremental Delay, d2	0.3	0.5			0.9			4.8			1.0	
Delay (s)	3.9	4.3			6.9			27.2			21.3	
Level of Service	A	A			A			C			C	
Approach Delay (s)		4.2			6.9			27.2			21.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

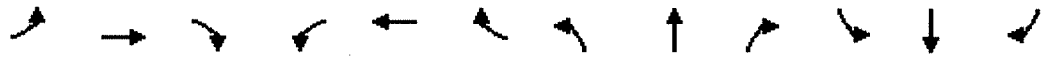
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	171	4	1	682	12	29	39	5	32	19	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	25		0	25		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. 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
Ped Bike Factor		1.00			1.00			1.00			0.99	
Frt		0.997			0.997			0.991			0.957	
Flt Protected	0.950			0.950				0.980			0.979	
Satd. Flow (prot)	1393	1433	0	1376	1443	0	0	1843	0	0	1767	0
Flt Permitted	0.275			0.641				0.877			0.867	
Satd. Flow (perm)	403	1433	0	928	1443	0	0	1649	0	0	1565	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			3			5			25	
Link Speed (mph)		25			20			25			25	
Link Distance (ft)		2034			1780			317			303	
Travel Time (s)		55.5			60.7			8.6			8.3	
Confl. Peds. (#/hr)			4			8			1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5						
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	14	180	4	1	718	13	31	41	5	34	20	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	184	0	1	731	0	0	77	0	0	79	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	15.5	15.5		15.5	15.5		18.5	18.5		18.5	18.5	
Total Split (s)	49.0	49.0	0.0	49.0	49.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Split (%)	70.0%	70.0%	0.0%	70.0%	70.0%	0.0%	30.0%	30.0%	0.0%	30.0%	30.0%	0.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	-0.5	-0.5	0.0	-0.5	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.0	4.5	4.5	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
v/c Ratio	0.05	0.20		0.00	0.79			0.20			0.20	
Control Delay	4.2	4.7		7.0	15.8			21.9			17.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	4.2	4.7		7.0	15.8			21.9			17.5	
Queue Length 50th (ft)	2	20		0	237			25			19	
Queue Length 95th (ft)	m5	34		m0	m191			58			51	
Internal Link Dist (ft)		1954			1700			237			223	
Turn Bay Length (ft)	25			25								
Base Capacity (vph)	259	922		597	929			393			388	
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	0.05	0.20		0.00	0.79			0.20			0.20	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 22 (31%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Division Street & 34th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	171	4	1	682	12	29	39	5	32	19	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	1.00			0.99			0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1393	1432		1376	1443			1843			1768	
Flt Permitted	0.27	1.00		0.64	1.00			0.88			0.87	
Satd. Flow (perm)	403	1432		929	1443			1650			1566	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	180	4	1	718	13	31	41	5	34	20	25
RTOR Reduction (vph)	0	1	0	0	1	0	0	4	0	0	19	0
Lane Group Flow (vph)	14	183	0	1	730	0	0	73	0	0	60	0
Confl. Peds. (#/hr)			4			8			1			1
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5						
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	44.5	44.5		44.5	44.5			16.5			16.5	
Effective Green, g (s)	45.0	45.0		45.0	45.0			16.5			16.5	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	259	921		597	928			389			369	
v/s Ratio Prot		0.13			c0.51							
v/s Ratio Perm	0.03			0.00				c0.04			0.04	
v/c Ratio	0.05	0.20		0.00	0.79			0.19			0.16	
Uniform Delay, d1	4.6	5.1		4.5	9.0			21.4			21.3	
Progression Factor	0.76	0.82		1.56	1.50			1.00			1.00	
Incremental Delay, d2	0.4	0.5		0.0	0.6			1.1			0.9	
Delay (s)	3.9	4.7		7.0	14.2			22.5			22.2	
Level of Service	A	A		A	B			C			C	
Approach Delay (s)		4.6			14.2			22.5			22.2	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

36797

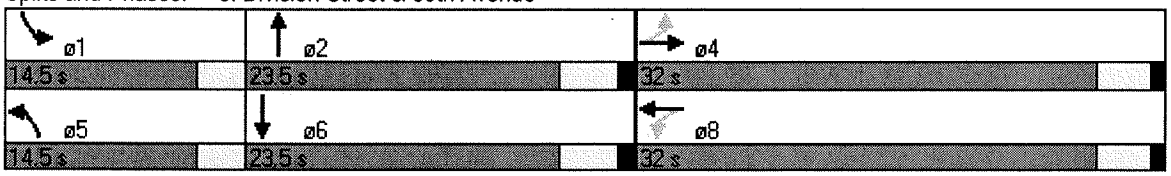
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	143	35	53	480	47	110	852	79	86	498	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		1.00			1.00			1.00			0.99	
Frt		0.971			0.987			0.987			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1592	1609	0	1573	*1000	0	1769	*3000	0	1717	*3000	0
Flt Permitted	0.210			0.614			0.950			0.950		
Satd. Flow (perm)	352	1609	0	1016	1631	0	1769	3519	0	1717	3412	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			8			14			35	
Link Speed (mph)		25			15			35			35	
Link Distance (ft)		1780			778			579			672	
Travel Time (s)		48.5			35.4			11.3			13.1	
Confl. Peds. (#/hr)			4			8			4			22
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	3%	1%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	5	5	5	5	5	5
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Adj. Flow (vph)	32	152	37	56	511	50	117	906	84	91	530	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	189	0	56	561	0	117	990	0	91	641	0
Turn Type	Perm			Perm			Prot			Prot		
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)	8.0	8.0		8.0	8.0		3.0	10.0		3.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		6.0	19.6		6.0	20.6	
Total Split (s)	32.0	32.0	0.0	32.0	32.0	0.0	14.5	23.5	0.0	14.5	23.5	0.0
Total Split (%)	45.7%	45.7%	0.0%	45.7%	45.7%	0.0%	20.7%	33.6%	0.0%	20.7%	33.6%	0.0%
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.6		3.0	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	-0.5	-0.5	0.0	-0.5	-0.5	0.0	1.0	-0.5	0.0	1.0	-0.5	0.0
Total Lost Time (s)	3.8	3.8	4.0	3.8	3.8	4.0	4.0	4.1	4.0	4.0	4.1	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	Max	Max		Max	Max		None	C-Max		None	C-Max	
v/c Ratio	0.23	0.29		0.14	1.38		0.55	0.96		0.47	0.63	
Control Delay	10.4	6.7		15.1	198.6		38.4	47.3		36.7	23.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	10.4	6.7		15.1	198.6		38.4	47.3		36.7	23.3	
Queue Length 50th (ft)	4	21		11	~313		48	~247		37	120	
Queue Length 95th (ft)	13	38		m19	m#458		94	#391		77	183	
Internal Link Dist (ft)		1700			698			499			592	
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	142	661		409	408		265	1029		258	1021	
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	0.23	0.29		0.14	1.38		0.44	0.96		0.35	0.63	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 15.9 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 120
Control Type: Actuated-Coordinated
* User Entered Value
~ 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: 8: Division Street & 39th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	143	35	53	480	47	110	852	79	86	498	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)	3.8	3.8		3.8	3.8		4.0	4.1		4.0	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1592	1608		1573	1000		1769	3000		1717	3000	
Flt Permitted	0.21	1.00		0.61	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	353	1608		1016	1630		1769	3520		1717	3412	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	152	37	56	511	50	117	906	84	91	530	111
RTOR Reduction (vph)	0	13	0	0	5	0	0	9	0	0	24	0
Lane Group Flow (vph)	32	176	0	56	556	0	117	981	0	91	617	0
Confl. Peds. (#/hr)			4			8			4			22
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	3%	1%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	5	5	5	5	5	5
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	27.7	27.7		27.7	27.7		8.2	22.7		7.7	22.2	
Effective Green, g (s)	28.2	28.2		28.2	28.2		7.2	23.2		6.7	22.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.10	0.33		0.10	0.32	
Clearance Time (s)	4.3	4.3		4.3	4.3		3.0	4.6		3.0	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	142	648		409	403		182	994		164	973	
v/s Ratio Prot		0.11			c0.56		c0.07	c0.33		0.05	0.21	
v/s Ratio Perm	0.09			0.06								
v/c Ratio	0.23	0.27		0.14	1.38		0.64	0.99		0.55	0.63	
Uniform Delay, d1	13.7	14.0		13.2	20.9		30.2	23.2		30.2	20.1	
Progression Factor	0.45	0.44		1.07	0.75		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.6	1.0		0.4	180.3		7.5	25.5		4.0	3.2	
Delay (s)	9.8	7.2		14.6	196.1		37.7	48.7		34.2	23.3	
Level of Service	A	A		B	F		D	D		C	C	
Approach Delay (s)		7.6			179.6			47.6			24.6	
Approach LOS		A			F			D			C	

Intersection Summary			
HCM Average Control Delay	68.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

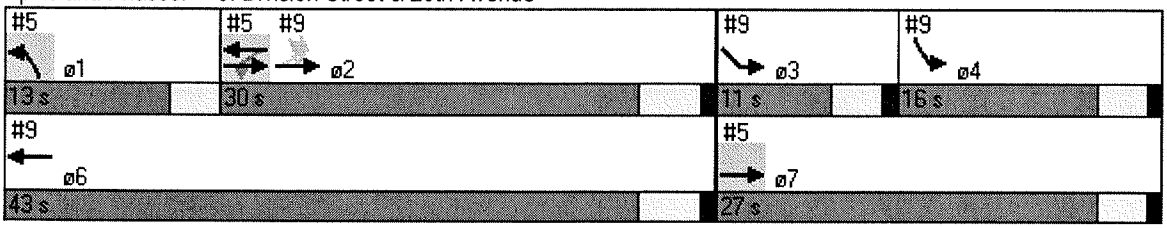
Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SEL	SER	ø1	ø7
Lane Configurations												
Volume (vph)	3	5	145	725	77	74	97	35	27	8		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12		
Grade (%)			0%	0%			0%		0%			
Storage Length (ft)		0			0		0	0	0	0		
Storage Lanes		0			0		1	0	1	0		
Taper Length (ft)		25			25		25	25	25	25		
Lane Util. Factor	1.00	1.00	1.00	*0.75	0.95	0.95	1.00	1.00	1.00	1.00		
Ped Bike Factor												
Frt				0.974			0.964		0.969			
Flt Protected			0.997				0.965		0.963			
Satd. Flow (prot)	0	0	1605	2458	0	0	1767	0	1773	0		
Flt Permitted			0.926				0.965		0.963			
Satd. Flow (perm)	0	0	1491	2458	0	0	1767	0	1773	0		
Right Turn on Red						No				No		
Satd. Flow (RTOR)												
Link Speed (mph)			25	20			25		25			
Link Distance (ft)			148	129			397		464			
Travel Time (s)			4.0	4.4			10.8		12.7			
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90		
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%		
Heavy Vehicles (%)	0%	8%	4%	0%	0%	0%	0%	0%	0%	0%		
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0		
Parking (#/hr)												
Mid-Block Traffic (%)			0%	0%			0%		0%			
Adj. Flow (vph)	3	6	161	806	86	82	108	39	30	9		
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	170	974	0	0	147	0	39	0		
Turn Type	Perm	Perm										
Protected Phases			2	6			4		3		1	7
Permitted Phases	2	2										
Detector Phase	2	2	2	6			4		3			
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0			3.0		3.0		3.0	3.0
Minimum Split (s)	28.0	28.0	28.0	28.0			7.0		15.0		13.0	12.0
Total Split (s)	30.0	30.0	30.0	43.0	0.0	0.0	16.0	0.0	11.0	0.0	13.0	27.0
Total Split (%)	42.9%	42.9%	42.9%	61.4%	0.0%	0.0%	22.9%	0.0%	15.7%	0.0%	19%	39%
Yellow Time (s)	3.7	3.7	3.7	3.7			3.0		3.0		3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0		1.0		0.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	3.7	3.7	3.7	3.7	4.0	4.0	4.0	4.0	4.0	4.0		
Lead/Lag	Lag	Lag	Lag				Lag		Lead		Lead	
Lead-Lag Optimize?	Yes	Yes	Yes				Yes		Yes		Yes	
Recall Mode	C-Max	C-Max	C-Max	Max			None		None		Max	Max
v/c Ratio			0.30	0.71			0.35		0.24			
Control Delay			17.1	7.6			27.6		33.0			

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SEL	SER	ø1	ø7
Queue Delay			0.0	10.7			0.0		0.0			
Total Delay			17.1	18.2			27.6		33.0			
Queue Length 50th (ft)			72	32			58		16			
Queue Length 95th (ft)			133	m52			111		43			
Internal Link Dist (ft)			68	49			317		384			
Turn Bay Length (ft)												
Base Capacity (vph)			560	1380			415		177			
Starvation Cap Reductn			0	386			0		0			
Spillback Cap Reductn			0	0			0		0			
Storage Cap Reductn			0	0			0		0			
Reduced v/c Ratio			0.30	0.98			0.35		0.22			

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 47.3 (68%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
* User Entered Value
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Division Street & 20th Avenue



Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SEL	SER
Lane Configurations										
Volume (vph)	3	5	145	725	77	74	97	35	27	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12
Total Lost time (s)			3.7	3.7			4.0		4.0	
Lane Util. Factor			1.00	*0.75			1.00		1.00	
Frt			1.00	0.97			0.96		0.97	
Flt Protected			1.00	1.00			0.96		0.96	
Satd. Flow (prot)			1606	2459			1767		1773	
Flt Permitted			0.93	1.00			0.96		0.96	
Satd. Flow (perm)			1490	2459			1767		1773	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	6	161	806	86	82	108	39	30	9
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	170	974	0	0	147	0	39	0
Heavy Vehicles (%)	0%	8%	4%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0
Turn Type	Perm	Perm								
Protected Phases			2	6			4		3	
Permitted Phases	2	2								
Actuated Green, G (s)			23.7	36.7			16.4		4.2	
Effective Green, g (s)			24.7	37.7			16.4		4.2	
Actuated g/C Ratio			0.35	0.54			0.23		0.06	
Clearance Time (s)			4.7	4.7			4.0		4.0	
Vehicle Extension (s)			3.0	3.0			3.0		3.0	
Lane Grp Cap (vph)			526	1324			414		106	
v/s Ratio Prot				c0.40			c0.08		c0.02	
v/s Ratio Perm			0.11							
v/c Ratio			0.32	0.74			0.36		0.37	
Uniform Delay, d1			16.5	12.3			22.4		31.6	
Progression Factor			0.99	0.52			1.00		1.00	
Incremental Delay, d2			1.6	1.9			0.5		2.2	
Delay (s)			17.9	8.2			22.9		33.8	
Level of Service			B	A			C		C	
Approach Delay (s)			17.9	8.2			22.9		33.8	
Approach LOS			B	A			C		C	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	11.7
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

36797 KAI Edit
6/17/2009

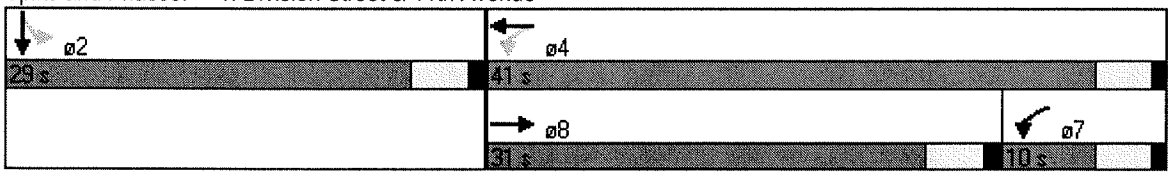
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	385	292	94	169	0	0	0	0	216	765	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Lane Util. Factor	1.00	*0.75	0.95	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Ped Bike Factor		0.99									1.00	
Frt		0.935									0.999	
Flt Protected					0.982						0.989	
Satd. Flow (prot)	0	*2500	0	0	1646	0	0	0	0	0	3503	0
Flt Permitted					0.511						0.989	
Satd. Flow (perm)	0	*2500	0	0	856	0	0	0	0	0	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		153									1	
Link Speed (mph)		20			25			25			25	
Link Distance (ft)		355			263			1501			1376	
Travel Time (s)		12.1			7.2			40.9			37.5	
Confl. Peds. (#/hr)			10			7				6		4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	7	7	5	5	0	0	0	0	0	5	5
Adj. Flow (vph)	0	414	314	101	182	0	0	0	0	232	823	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	728	0	0	283	0	0	0	0	0	1064	0
Turn Type				pm+pt						Perm		
Protected Phases		8		7	4						2	
Permitted Phases				4						2		
Detector Phase		8		7	4					2	2	
Switch Phase												
Minimum Initial (s)		10.0		5.0	10.0					10.0	10.0	
Minimum Split (s)		25.6		9.4	36.4					19.6	19.6	
Total Split (s)	0.0	31.0	0.0	10.0	41.0	0.0	0.0	0.0	0.0	29.0	29.0	0.0
Total Split (%)	0.0%	44.3%	0.0%	14.3%	58.6%	0.0%	0.0%	0.0%	0.0%	41.4%	41.4%	0.0%
Yellow Time (s)		3.6		3.4	3.4					3.6	3.6	
All-Red Time (s)		1.0		1.0	1.0					1.0	1.0	
Lost Time Adjust (s)	0.0	-0.5	0.0	-0.5	-0.5	0.0	0.0	0.0	0.0	-0.5	-0.5	0.0
Total Lost Time (s)	4.0	4.1	4.0	3.9	3.9	4.0	4.0	4.0	4.0	4.1	4.1	4.0
Lead/Lag		Lead		Lag								
Lead-Lag Optimize?		Yes		Yes								
Recall Mode		Max		Max	Max					C-Max	C-Max	
v/c Ratio		0.69			0.54						0.85	
Control Delay		18.1			16.0						29.5	
Queue Delay		0.0			2.2						0.0	
Total Delay		18.1			18.2						29.5	
Queue Length 50th (ft)		133			44						218	
Queue Length 95th (ft)		210			64						#330	
Internal Link Dist (ft)		275			183			1421			1296	
Turn Bay Length (ft)												
Base Capacity (vph)		1055			523						1245	
Starvation Cap Reductn		0			129						0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.69			0.72						0.85	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 16.9 (24%), Referenced to phase 2:SBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
* User Entered Value
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Division Street & 11th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	385	292	94	169	0	0	0	0	216	765	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.1			3.9						4.1	
Lane Util. Factor		*0.75			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.94			1.00						1.00	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		2500			1646						3496	
Flt Permitted		1.00			0.51						0.99	
Satd. Flow (perm)		2500			856						3496	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	414	314	101	182	0	0	0	0	232	823	9
RTOR Reduction (vph)	0	94	0	0	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	634	0	0	283	0	0	0	0	0	1063	0
Confl. Peds. (#/hr)			10			7				6		4
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	7	7	5	5	0	0	0	0	0	5	5
Turn Type				pm+pt						Perm		
Protected Phases		8		7	4						2	
Permitted Phases				4						2		
Actuated Green, G (s)		26.4			36.6						24.4	
Effective Green, g (s)		26.9			37.1						24.9	
Actuated g/C Ratio		0.38			0.53						0.36	
Clearance Time (s)		4.6			4.4						4.6	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		961			523						1244	
v/s Ratio Prot		c0.25			c0.05							
v/s Ratio Perm					0.24						0.30	
v/c Ratio		0.66			0.54						0.85	
Uniform Delay, d1		17.8			10.8						20.9	
Progression Factor		1.00			0.96						1.00	
Incremental Delay, d2		3.5			3.7						7.6	
Delay (s)		21.3			14.1						28.5	
Level of Service		C			B						C	
Approach Delay (s)		21.3			14.1			0.0			28.5	
Approach LOS		C			B			A			C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.2
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	571	0	0	211	106	47	632	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Lane Util. Factor	0.95	*0.75	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Ped Bike Factor					0.99			1.00				
Frt					0.955			0.982				
Flt Protected		0.997						0.997				
Satd. Flow (prot)	0	2522	0	0	1590	0	0	3458	0	0	0	0
Flt Permitted		0.927						0.997				
Satd. Flow (perm)	0	2344	0	0	1590	0	0	3455	0	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					48			27				
Link Speed (mph)		20			25			25			25	
Link Distance (ft)		263			461			1504			1317	
Travel Time (s)		9.0			12.6			41.0			35.9	
Confl. Peds. (#/hr)			20			4	7		8			
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	0	0	5	5	0	5	5	0	0	0
Adj. Flow (vph)	32	601	0	0	222	112	49	665	97	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	633	0	0	334	0	0	811	0	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Detector Phase	2	2			2		4	4				
Switch Phase												
Minimum Initial (s)	10.0	10.0			10.0		10.0	10.0				
Minimum Split (s)	16.4	16.4			16.4		23.4	23.4				
Total Split (s)	36.0	36.0	0.0	0.0	36.0	0.0	34.0	34.0	0.0	0.0	0.0	0.0
Total Split (%)	51.4%	51.4%	0.0%	0.0%	51.4%	0.0%	48.6%	48.6%	0.0%	0.0%	0.0%	0.0%
Yellow Time (s)	3.4	3.4			3.4		3.4	3.4				
All-Red Time (s)	1.0	1.0			1.0		1.0	1.0				
Lost Time Adjust (s)	-0.5	-0.5	0.0	0.0	-0.5	0.0	-0.5	-0.5	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.9	3.9	4.0	4.0	3.9	4.0	3.9	3.9	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max			C-Max		Max	Max				
v/c Ratio		0.59			0.44			0.54				
Control Delay		10.8			7.2			15.9				
Queue Delay		0.5			0.0			0.0				
Total Delay		11.3			7.2			15.9				
Queue Length 50th (ft)		80			48			126				
Queue Length 95th (ft)		m145			89			176				
Internal Link Dist (ft)		183			381			1424			1237	
Turn Bay Length (ft)												
Base Capacity (vph)		1075			755			1501				
Starvation Cap Reductn		146			0			0				

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0			0				
Storage Cap Reductn		0			0			0				
Reduced v/c Ratio		0.68			0.44			0.54				

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 45.1 (64%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated
* User Entered Value
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Division Street & 12th Avenue

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	571	0	0	211	106	47	632	92	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		3.9			3.9			3.9				
Lane Util. Factor		*0.75			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.95			0.98				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		2523			1590			3455				
Flt Permitted		0.93			1.00			1.00				
Satd. Flow (perm)		2344			1590			3455				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	601	0	0	222	112	49	665	97	0	0	0
RTOR Reduction (vph)	0	0	0	0	26	0	0	15	0	0	0	0
Lane Group Flow (vph)	0	633	0	0	308	0	0	796	0	0	0	0
Confl. Peds. (#/hr)			20			4	7		8			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	0	0	5	5	0	5	5	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		31.6			31.6			29.6				
Effective Green, g (s)		32.1			32.1			30.1				
Actuated g/C Ratio		0.46			0.46			0.43				
Clearance Time (s)		4.4			4.4			4.4				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		1075			729			1486				
v/s Ratio Prot					0.19							
v/s Ratio Perm		c0.27						0.23				
v/c Ratio		0.59			0.42			0.54				
Uniform Delay, d1		14.1			12.7			14.8				
Progression Factor		0.64			0.47			1.00				
Incremental Delay, d2		1.5			1.8			1.4				
Delay (s)		10.5			7.8			16.2				
Level of Service		B			A			B				
Approach Delay (s)		10.5			7.8			16.2			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

36797

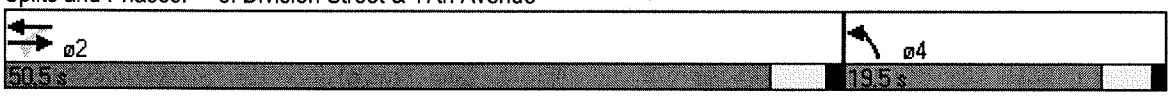
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	630	33	7	280	35	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	12	12
Lane Util. Factor	*0.75	0.95	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99	
Frt	0.992				0.959	
Flt Protected				0.999	0.966	
Satd. Flow (prot)	2349	0	0	1674	1744	0
Flt Permitted				0.984	0.966	
Satd. Flow (perm)	2349	0	0	1649	1744	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	12				16	
Link Speed (mph)	20			25	25	
Link Distance (ft)	834			456	403	
Travel Time (s)	28.4			12.4	11.0	
Confl. Peds. (#/hr)		1				14
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Parking (#/hr)	5	5				
Adj. Flow (vph)	663	35	7	295	37	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	698	0	0	302	53	0
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Detector Phase	2		2	2	4	
Switch Phase						
Minimum Initial (s)	10.0		10.0	10.0	10.0	
Minimum Split (s)	16.5		16.5	16.5	19.0	
Total Split (s)	50.5	0.0	50.5	50.5	19.5	0.0
Total Split (%)	72.1%	0.0%	72.1%	72.1%	27.9%	0.0%
Yellow Time (s)	3.5		3.5	3.5	3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	-0.5	0.0	-0.5	-0.5	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max		C-Max	C-Max	None	
v/c Ratio	0.35			0.22	0.20	
Control Delay	1.3			1.7	22.4	
Queue Delay	0.0			0.0	0.0	
Total Delay	1.3			1.7	22.4	
Queue Length 50th (ft)	22			13	14	
Queue Length 95th (ft)	26			m40	44	
Internal Link Dist (ft)	754			376	323	
Turn Bay Length (ft)						
Base Capacity (vph)	1988			1395	399	

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Starvation Cap Reductn	0			0	0	
Spillback Cap Reductn	0			0	0	
Storage Cap Reductn	0			0	0	
Reduced v/c Ratio	0.35			0.22	0.13	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 23 (33%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
* User Entered Value
m Volume for 95th percentile queue is metered by upstream signal.

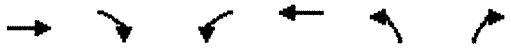
Splits and Phases: 3: Division Street & 17th Avenue



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	630	33	7	280	35	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*0.75			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.96	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	2350			1674	1745	
Flt Permitted	1.00			0.98	0.97	
Satd. Flow (perm)	2350			1649	1745	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	663	35	7	295	37	16
RTOR Reduction (vph)	2	0	0	0	15	0
Lane Group Flow (vph)	696	0	0	302	38	0
Confl. Peds. (#/hr)		1				14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Parking (#/hr)	5	5				
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	55.5			55.5	6.0	
Effective Green, g (s)	56.0			56.0	6.0	
Actuated g/C Ratio	0.80			0.80	0.09	
Clearance Time (s)	4.5			4.5	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1880			1319	150	
v/s Ratio Prot	c0.30				c0.02	
v/s Ratio Perm				0.18		
v/c Ratio	0.37			0.23	0.26	
Uniform Delay, d1	2.0			1.7	29.9	
Progression Factor	0.36			0.62	1.00	
Incremental Delay, d2	0.5			0.3	0.9	
Delay (s)	1.2			1.4	30.8	
Level of Service	A			A	C	
Approach Delay (s)	1.2			1.4	30.8	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	2.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	551	67	44	308	4	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	12	12
Lane Util. Factor	*0.75	0.95	1.00	1.00	1.00	1.00
Frt	0.984				0.880	
Flt Protected				0.994	0.995	
Satd. Flow (prot)	2333	0	0	1666	1664	0
Flt Permitted				0.994	0.995	
Satd. Flow (perm)	2333	0	0	1666	1664	0
Link Speed (mph)	20			25	25	
Link Distance (ft)	303			148	497	
Travel Time (s)	10.3			4.0	13.6	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Parking (#/hr)	5	5				
Adj. Flow (vph)	580	71	46	324	4	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	651	0	0	370	37	0
Sign Control	Free			Free	Stop	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	

* User Entered Value

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	551	67	44	308	4	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	580	71	46	324	4	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)	759			148		
pX, platoon unblocked					0.90	
vC, conflicting volume			651		1032	325
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			651		979	325
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		98	95
cM capacity (veh/h)			945		214	676

Direction, Lane #	EB 1	EB 2	WB 1	NB 1
Volume Total	387	264	371	37
Volume Left	0	0	46	4
Volume Right	0	71	0	33
cSH	1700	1700	945	543
Volume to Capacity	0.23	0.16	0.05	0.07
Queue Length 95th (ft)	0	0	4	5
Control Delay (s)	0.0	0.0	1.6	12.1
Lane LOS			A	B
Approach Delay (s)	0.0		1.6	12.1
Approach LOS				B

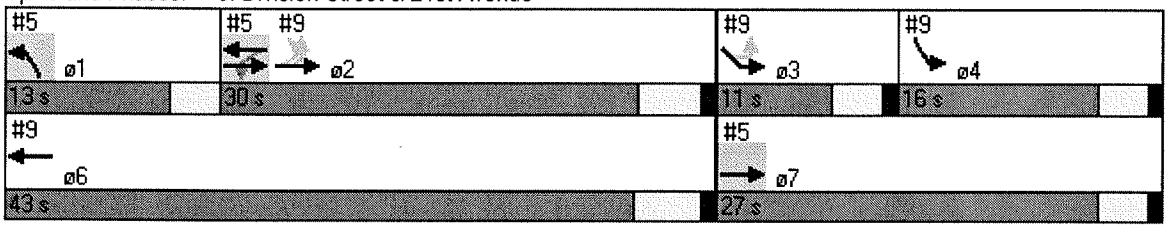
Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3	ø4	ø6	ø7
Lane Configurations										
Volume (vph)	663	157	15	337	115	57				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Width (ft)	9	9	9	9	12	12				
Lane Util. Factor	*0.75	0.95	1.00	1.00	1.00	1.00				
Frt	0.971				0.955					
Flt Protected				0.998	0.968					
Satd. Flow (prot)	2456	0	0	1672	1756	0				
Flt Permitted				0.937	0.968					
Satd. Flow (perm)	2456	0	0	1570	1756	0				
Right Turn on Red		No				Yes				
Satd. Flow (RTOR)					30					
Link Speed (mph)	20			25	25					
Link Distance (ft)	129			1277	514					
Travel Time (s)	4.4			34.8	14.0					
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94				
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%				
Bus Blockages (#/hr)	7	7	5	5	0	0				
Adj. Flow (vph)	705	167	16	359	122	61				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	872	0	0	375	183	0				
Turn Type			Perm							
Protected Phases	2 7			2	1		3	4	6	7
Permitted Phases			2							
Detector Phase	2 7		2	2	1					
Switch Phase										
Minimum Initial (s)			20.0	20.0	3.0		3.0	3.0	20.0	3.0
Minimum Split (s)			27.7	27.7	13.0		15.0	7.0	28.0	12.0
Total Split (s)	57.0	0.0	30.0	30.0	13.0	0.0	11.0	16.0	43.0	27.0
Total Split (%)	81.4%	0.0%	42.9%	42.9%	18.6%	0.0%	16%	23%	61%	39%
Yellow Time (s)			3.7	3.7	3.0		3.0	3.0	4.0	3.0
All-Red Time (s)			1.0	1.0	0.0		1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	0.0	-1.0	-1.0	1.0	0.0				
Total Lost Time (s)	3.7	4.0	3.7	3.7	4.0	4.0				
Lead/Lag			Lag	Lag	Lead		Lead	Lag		
Lead-Lag Optimize?			Yes	Yes	Yes		Yes	Yes		
Recall Mode			C-Max	C-Max	Min		None	None	Max	Max
v/c Ratio	0.46			0.62	0.77					
Control Delay	1.0			19.6	47.8					
Queue Delay	0.8			0.1	0.4					
Total Delay	1.8			19.7	48.2					
Queue Length 50th (ft)	3			142	64					
Queue Length 95th (ft)	18			231	#157					
Internal Link Dist (ft)	49			1197	434					
Turn Bay Length (ft)										
Base Capacity (vph)	1890			603	252					
Starvation Cap Reductn	643			0	0					
Spillback Cap Reductn	0			12	4					
Storage Cap Reductn	0			0	0					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	ø3	ø4	ø6	ø7
Reduced v/c Ratio	0.70			0.63	0.74					

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 47.3 (68%), Referenced to phase 2:EBWB, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
* User Entered Value	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 5: Division Street & 21st Avenue



36797

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	663	157	15	337	115	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	3.7			3.7	4.0	
Lane Util. Factor	*0.75			1.00	1.00	
Frt	0.97			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	2456			1672	1756	
Flt Permitted	1.00			0.94	0.97	
Satd. Flow (perm)	2456			1571	1756	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	705	167	16	359	122	61
RTOR Reduction (vph)	0	0	0	0	26	0
Lane Group Flow (vph)	872	0	0	375	157	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Turn Type			Perm			
Protected Phases	2 7			2	1	
Permitted Phases			2			
Actuated Green, G (s)	53.6			25.9	9.4	
Effective Green, g (s)	54.6			26.9	8.4	
Actuated g/C Ratio	0.78			0.38	0.12	
Clearance Time (s)				4.7	3.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)	1916			604	211	
v/s Ratio Prot	c0.35				c0.09	
v/s Ratio Perm				c0.24		
v/c Ratio	0.46			0.62	0.74	
Uniform Delay, d1	2.6			17.4	29.8	
Progression Factor	0.15			0.82	1.00	
Incremental Delay, d2	0.5			4.4	13.1	
Delay (s)	0.9			18.7	42.9	
Level of Service	A			B	D	
Approach Delay (s)	0.9			18.7	42.9	
Approach LOS	A			B	D	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.7
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

3 6 7 9 7

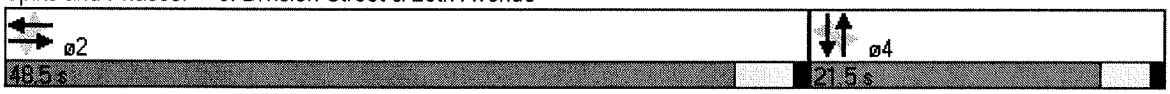
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	545	73	41	377	27	58	120	62	13	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Storage Length (ft)	25		0	25		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	0.95	*0.75	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		1.00			1.00			0.99			0.99	
Frt		0.983			0.990			0.965			0.976	
Flt Protected		0.999		0.950				0.988			0.995	
Satd. Flow (prot)	0	2319	0	1592	1653	0	0	1799	0	0	1829	0
Flt Permitted		0.945		0.302				0.911			0.962	
Satd. Flow (perm)	0	2193	0	506	1653	0	0	1659	0	0	1768	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		30			10			24			15	
Link Speed (mph)		20			25			25			25	
Link Distance (ft)		1277			504			552			449	
Travel Time (s)		43.5			13.7			15.1			12.2	
Confl. Peds. (#/hr)			5			10			11			13
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Adj. Flow (vph)	15	574	77	43	397	28	61	126	65	14	100	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	666	0	43	425	0	0	252	0	0	139	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.5	15.5		15.5	15.5		19.0	19.0		19.0	19.0	
Total Split (s)	48.5	48.5	0.0	48.5	48.5	0.0	21.5	21.5	0.0	21.5	21.5	0.0
Total Split (%)	69.3%	69.3%	0.0%	69.3%	69.3%	0.0%	30.7%	30.7%	0.0%	30.7%	30.7%	0.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	-0.5	-0.5	0.0	-0.5	-0.5	0.0	-0.5	-0.5	0.0	-0.5	-0.5	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	4.0	3.5	3.5	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
v/c Ratio		0.47		0.13	0.40			0.57			0.30	
Control Delay		4.5		1.9	2.3			26.2			20.7	
Queue Delay		0.0		0.0	0.0			0.0			0.0	
Total Delay		4.5		1.9	2.3			26.2			20.7	
Queue Length 50th (ft)		27		1	10			85			43	
Queue Length 95th (ft)		73		m2	16			154			87	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1197			424			472			369	
Turn Bay Length (ft)				25								
Base Capacity (vph)		1405		322	1054			444			466	
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		0.47		0.13	0.40			0.57			0.30	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 22 (31%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
* User Entered Value
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Division Street & 26th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	545	73	41	377	27	58	120	62	13	95	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0		4.0	4.0			3.5			3.5	
Lane Util. Factor		*0.75		1.00	1.00			1.00			1.00	
Frpb, ped/bikes		1.00		1.00	1.00			0.99			0.99	
Flpb, ped/bikes		1.00		1.00	1.00			1.00			1.00	
Frt		0.98		1.00	0.99			0.97			0.98	
Flt Protected		1.00		0.95	1.00			0.99			0.99	
Satd. Flow (prot)		2318		1592	1654			1799			1828	
Flt Permitted		0.94		0.30	1.00			0.91			0.96	
Satd. Flow (perm)		2192		506	1654			1659			1768	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	574	77	43	397	28	61	126	65	14	100	25
RTOR Reduction (vph)	0	11	0	0	4	0	0	18	0	0	11	0
Lane Group Flow (vph)	0	655	0	43	421	0	0	234	0	0	128	0
Confl. Peds. (#/hr)			5			10			11			13
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		44.0		44.0	44.0			17.5			17.5	
Effective Green, g (s)		44.5		44.5	44.5			18.0			18.0	
Actuated g/C Ratio		0.64		0.64	0.64			0.26			0.26	
Clearance Time (s)		4.5		4.5	4.5			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		1393		322	1051			427			455	
v/s Ratio Prot					0.25							
v/s Ratio Perm		c0.30		0.08				c0.14			0.07	
v/c Ratio		0.47		0.13	0.40			0.55			0.28	
Uniform Delay, d1		6.6		5.1	6.2			22.5			20.8	
Progression Factor		0.54		0.21	0.21			1.00			1.00	
Incremental Delay, d2		1.0		0.8	1.0			5.0			1.5	
Delay (s)		4.6		1.8	2.3			27.5			22.4	
Level of Service		A		A	A			C			C	
Approach Delay (s)		4.6			2.3			27.5			22.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	7.5
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

36797 KAI Edit
6/17/2009

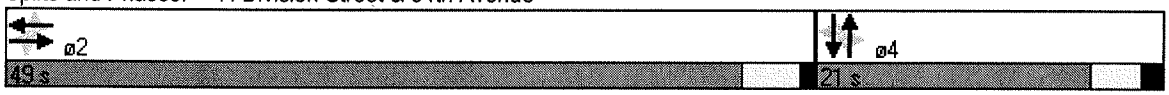
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	663	8	19	416	32	2	27	12	33	39	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Storage Length (ft)	25		0	25		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. 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
Ped Bike Factor		1.00			1.00			0.98			0.99	
Frt		0.998			0.989			0.959			0.964	
Flt Protected	0.950			0.950				0.998			0.983	
Satd. Flow (prot)	1382	1451	0	1393	1446	0	0	1789	0	0	1781	0
Flt Permitted	0.439			0.290				0.991			0.902	
Satd. Flow (perm)	638	1451	0	425	1446	0	0	1776	0	0	1634	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			11			13			25	
Link Speed (mph)		20			25			25			25	
Link Distance (ft)		2033			1780			317			303	
Travel Time (s)		69.3			48.5			8.6			8.3	
Confl. Peds. (#/hr)			8			5			14			8
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5				0		
Adj. Flow (vph)	32	698	8	20	438	34	2	28	13	35	41	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	706	0	20	472	0	0	43	0	0	104	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Detector Phase	2	2		2	2		4	4		4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	15.5	15.5		15.5	15.5		18.5	18.5		18.5	18.5	
Total Split (s)	49.0	49.0	0.0	49.0	49.0	0.0	21.0	21.0	0.0	21.0	21.0	0.0
Total Split (%)	70.0%	70.0%	0.0%	70.0%	70.0%	0.0%	30.0%	30.0%	0.0%	30.0%	30.0%	0.0%
Yellow Time (s)	3.5	3.5		3.5	3.5		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.5	1.5		1.5	1.5	
Lost Time Adjust (s)	-0.5	-0.5	0.0	-0.5	-0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.5	4.5	4.0	4.5	4.5	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		Max	Max		Max	Max	
v/c Ratio	0.08	0.76		0.07	0.51			0.10			0.26	
Control Delay	7.7	17.1		5.5	8.8			17.0			19.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	7.7	17.1		5.5	8.8			17.0			19.0	
Queue Length 50th (ft)	6	175		3	90			10			27	
Queue Length 95th (ft)	m14	358		10	155			33			66	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1953			1700			237			223	
Turn Bay Length (ft)	25			25								
Base Capacity (vph)	410	934		273	934			429			404	
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	0.08	0.76		0.07	0.51			0.10			0.26	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 22 (31%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Division Street & 34th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	663	8	19	416	32	2	27	12	33	39	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.5			4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.99			0.96			0.96	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.98	
Satd. Flow (prot)	1382	1451		1393	1447			1788			1781	
Flt Permitted	0.44	1.00		0.29	1.00			0.99			0.90	
Satd. Flow (perm)	639	1451		425	1447			1776			1633	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	698	8	20	438	34	2	28	13	35	41	28
RTOR Reduction (vph)	0	1	0	0	4	0	0	10	0	0	19	0
Lane Group Flow (vph)	32	705	0	20	468	0	0	33	0	0	85	0
Confl. Peds. (#/hr)			8			5			14			8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5				0		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)	44.5	44.5		44.5	44.5			16.5			16.5	
Effective Green, g (s)	45.0	45.0		45.0	45.0			16.5			16.5	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.24			0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	411	933		273	930			419			385	
v/s Ratio Prot		c0.49			0.32							
v/s Ratio Perm	0.05			0.05				0.02			c0.05	
v/c Ratio	0.08	0.76		0.07	0.50			0.08			0.22	
Uniform Delay, d1	4.7	8.7		4.7	6.6			20.8			21.6	
Progression Factor	1.49	1.22		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.3	5.3		0.5	1.9			0.4			1.3	
Delay (s)	7.4	15.9		5.2	8.5			21.2			22.9	
Level of Service	A	B		A	A			C			C	
Approach Delay (s)		15.5			8.4			21.2			22.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

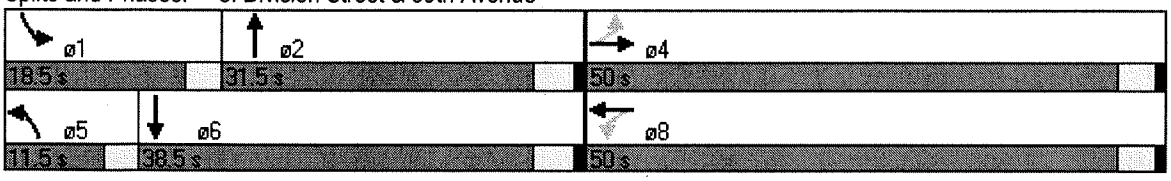
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	477	68	67	283	74	80	696	111	172	861	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Storage Length (ft)	150		0	150		0	150		0	150		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	25		25	25		25	25		25	25		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor		0.99			1.00			0.99			0.99	
Frt		0.981			0.969			0.979			0.984	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1579	1619	0	1592	1611	0	1769	*3000	0	1769	*3000	0
Flt Permitted	0.421			0.246			0.950			0.950		
Satd. Flow (perm)	700	1619	0	412	1611	0	1769	3462	0	1769	3466	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			17			18			14	
Link Speed (mph)		20			25			35			35	
Link Distance (ft)		1780			778			579			672	
Travel Time (s)		60.7			21.2			11.3			13.1	
Confl. Peds. (#/hr)			28			4			14			37
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	5	5	5	5	5	5
Adj. Flow (vph)	88	497	71	70	295	77	83	725	116	179	897	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	568	0	70	372	0	83	841	0	179	1005	0
Turn Type	Perm			Perm			Prot			Prot		
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)	8.0	8.0		8.0	8.0		3.0	10.0		3.0	10.0	
Minimum Split (s)	23.3	23.3		23.3	23.3		6.0	19.6		6.0	20.6	
Total Split (s)	50.0	50.0	0.0	50.0	50.0	0.0	11.5	31.5	0.0	18.5	38.5	0.0
Total Split (%)	50.0%	50.0%	0.0%	50.0%	50.0%	0.0%	11.5%	31.5%	0.0%	18.5%	38.5%	0.0%
Yellow Time (s)	3.3	3.3		3.3	3.3		3.0	3.6		3.0	3.6	
All-Red Time (s)	1.0	1.0		1.0	1.0		0.0	1.0		0.0	1.0	
Lost Time Adjust (s)	-0.5	-0.5	0.0	-0.5	-0.5	0.0	1.0	-0.5	0.0	1.0	-0.5	0.0
Total Lost Time (s)	3.8	3.8	4.0	3.8	3.8	4.0	4.0	4.1	4.0	4.0	4.1	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	Max	Max		Max	Max		None	C-Max		None	C-Max	
v/c Ratio	0.27	0.75		0.37	0.49		0.66	0.95		0.78	0.91	
Control Delay	19.5	29.6		24.6	20.6		70.3	56.7		65.0	43.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.5	29.6		24.6	20.6		70.3	56.7		65.0	43.4	
Queue Length 50th (ft)	33	285		28	152		52	~281		110	324	
Queue Length 95th (ft)	71	427		69	236		#120	#416		#202	#465	
Internal Link Dist (ft)		1700			698			499			592	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	150			150			150			150		
Base Capacity (vph)	323	753		190	753		133	881		257	1110	
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	0.27	0.75		0.37	0.49		0.62	0.95		0.70	0.91	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 62.9 (63%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
* User Entered Value
~ 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: 8: Division Street & 39th Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	84	477	68	67	283	74	80	696	111	172	861	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)	3.8	3.8		3.8	3.8		4.0	4.1		4.0	4.1	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1579	1620		1592	1611		1769	3000		1769	3000	
Flt Permitted	0.42	1.00		0.25	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	699	1620		412	1611		1769	3463		1769	3466	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	88	497	71	70	295	77	83	725	116	179	897	108
RTOR Reduction (vph)	0	5	0	0	9	0	0	13	0	0	9	0
Lane Group Flow (vph)	88	563	0	70	363	0	83	828	0	179	996	0
Confl. Peds. (#/hr)			28			4			14			37
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	5	5	5	5	5	5
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	45.7	45.7		45.7	45.7		6.8	28.4		14.0	35.6	
Effective Green, g (s)	46.2	46.2		46.2	46.2		5.8	28.9		13.0	36.1	
Actuated g/C Ratio	0.46	0.46		0.46	0.46		0.06	0.29		0.13	0.36	
Clearance Time (s)	4.3	4.3		4.3	4.3		3.0	4.6		3.0	4.6	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	748		190	744		103	867		230	1083	
v/s Ratio Prot		c0.35			0.23		0.05	0.28		c0.10	c0.33	
v/s Ratio Perm	0.13			0.17								
v/c Ratio	0.27	0.75		0.37	0.49		0.81	0.96		0.78	0.92	
Uniform Delay, d1	16.6	22.2		17.4	18.7		46.5	34.9		42.1	30.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	6.9		5.4	2.3		35.2	21.5		15.2	13.8	
Delay (s)	18.6	29.1		22.9	21.0		81.7	56.4		57.3	44.3	
Level of Service	B	C		C	C		F	E		E	D	
Approach Delay (s)		27.7			21.3			58.6			46.3	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	7.8
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SBR2	SEL2	SEL	SER
Lane Configurations												
Volume (vph)	2	17	569	292	54	109	157	43	1	15	105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	9	9	9	9	9	9	12	12	12	12	12	12
Lane Util. Factor	0.95	0.95	*0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.952			0.971					
Flt Protected			0.998				0.962				0.950	
Satd. Flow (prot)	0	0	2524	1595	0	0	1775	0	0	0	1734	0
Flt Permitted			0.934				0.962				0.950	
Satd. Flow (perm)	0	0	2362	1595	0	0	1775	0	0	0	1734	0
Right Turn on Red						No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)			20	25			25				25	
Link Distance (ft)			148	129			397				464	
Travel Time (s)			5.0	3.5			10.8				12.7	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Adj. Flow (vph)	2	18	612	314	58	117	169	46	1	16	113	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	632	489	0	0	216	0	0	0	129	0
Turn Type	Perm	Perm								Perm		
Protected Phases			2	6			4				3	
Permitted Phases	2	2								3		
Detector Phase	2	2	2	6			4			3	3	
Switch Phase												
Minimum Initial (s)	20.0	20.0	20.0	20.0			3.0			3.0	3.0	
Minimum Split (s)	27.7	27.7	27.7	28.0			7.0			15.0	15.0	
Total Split (s)	30.0	30.0	30.0	43.0	0.0	0.0	16.0	0.0	0.0	11.0	11.0	0.0
Total Split (%)	42.9%	42.9%	42.9%	61.4%	0.0%	0.0%	22.9%	0.0%	0.0%	15.7%	15.7%	0.0%
Yellow Time (s)	3.7	3.7	3.7	4.0			3.0			3.0	3.0	
All-Red Time (s)	1.0	1.0	1.0	1.0			1.0			1.0	1.0	
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.7	3.7	3.7	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag				Lag			Lead	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes				Yes			Yes	Yes	
Recall Mode	C-Max	C-Max	C-Max	Max			None			None	None	
v/c Ratio			0.70	0.55			0.71				0.75	
Control Delay			13.5	4.1			42.4				58.6	
Queue Delay			0.0	1.6			0.0				0.0	
Total Delay			13.5	5.8			42.4				58.6	
Queue Length 50th (ft)			116	12			89				55	
Queue Length 95th (ft)			184	m27			#182				#138	
Internal Link Dist (ft)			68	49			317				384	
Turn Bay Length (ft)												
Base Capacity (vph)			907	889			304				173	
Starvation Cap Reductn			0	234			0				0	
Spillback Cap Reductn			0	0			0				0	
Storage Cap Reductn			0	0			0				0	

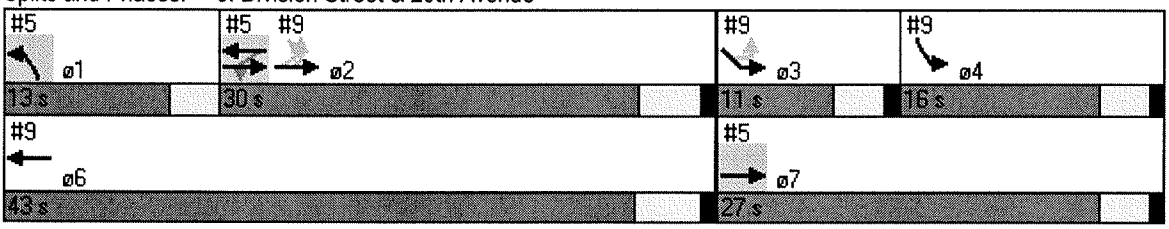
Lane Group	ø1	ø7
Lane Configurations		
Volume (vph)		
Ideal Flow (vphpl)		
Lane Width (ft)		
Lane Util. Factor		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Right Turn on Red		
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor		
Heavy Vehicles (%)		
Bus Blockages (#/hr)		
Adj. Flow (vph)		
Shared Lane Traffic (%)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	1	7
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	13.0	12.0
Total Split (s)	13.0	27.0
Total Split (%)	19%	39%
Yellow Time (s)	3.0	3.0
All-Red Time (s)	0.0	1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	
Lead-Lag Optimize?	Yes	
Recall Mode	Min	Max
v/c Ratio		
Control Delay		
Queue Delay		
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		

Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SBR2	SEL2	SEL	SER
Reduced v/c Ratio			0.70	0.75			0.71				0.75	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 70
Offset: 47.3 (68%), Referenced to phase 2:EBWB, Start of Yellow
Natural Cycle: 70
Control Type: Actuated-Coordinated
* User Entered Value
\# 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: 9: Division Street & 20th Avenue



Lane Group	ø1	ø7
Reduced v/c Ratio		

Intersection Summary

36797

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SBR2	SEL2	SEL	SER
Lane Configurations												
Volume (vph)	2	17	569	292	54	109	157	43	1	15	105	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)			3.7	4.0			4.0				4.0	
Lane Util. Factor			*0.75	1.00			1.00				1.00	
Frt			1.00	0.95			0.97				1.00	
Flt Protected			1.00	1.00			0.96				0.95	
Satd. Flow (prot)			2525	1595			1775				1734	
Flt Permitted			0.93	1.00			0.96				0.95	
Satd. Flow (perm)			2362	1595			1775				1734	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2	18	612	314	58	117	169	46	1	16	113	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	632	489	0	0	216	0	0	0	129	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Turn Type	Perm	Perm								Perm		
Protected Phases			2	6			4				3	
Permitted Phases	2	2								3		
Actuated Green, G (s)			25.9	38.0			12.0				7.0	
Effective Green, g (s)			26.9	39.0			12.0				7.0	
Actuated g/C Ratio			0.38	0.56			0.17				0.10	
Clearance Time (s)			4.7	5.0			4.0				4.0	
Vehicle Extension (s)			3.0	3.0			3.0				3.0	
Lane Grp Cap (vph)			908	889			304				173	
v/s Ratio Prot				c0.31			c0.12					
v/s Ratio Perm			c0.27								0.07	
v/c Ratio			0.70	0.55			0.71				0.75	
Uniform Delay, d1			18.1	9.9			27.4				30.6	
Progression Factor			0.49	0.21			1.00				1.00	
Incremental Delay, d2			4.2	1.9			7.6				16.0	
Delay (s)			13.1	4.0			35.0				46.6	
Level of Service			B	A			C				D	
Approach Delay (s)			13.1	4.0			35.0				46.6	
Approach LOS			B	A			C				D	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	15.7
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

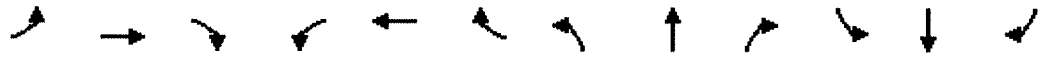
Appendix D
Synchro Analysis
One-Lane Existing Timings

HCM Signalized Intersection Capacity Analysis
1: Division Street & 11th Avenue

6/30/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.92			1.00						1.00	
Flt Protected		1.00			0.98						1.00	
Satd. Flow (prot)		1490			1626						3482	
Flt Permitted		1.00			0.68						1.00	
Satd. Flow (perm)		1490			1124						3482	
Volume (vph)	0	105	158	316	569	0	0	0	0	46	453	8
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	118	178	355	639	0	0	0	0	52	509	9
Lane Group Flow (vph)	0	296	0	0	994	0	0	0	0	0	570	0
Confl. Peds. (#/hr)			12			2				5		10
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	5	5	8	8	0	0	0	0	0	5	5
Turn Type				pm+pt						Perm		
Protected Phases		8		7	4						2	
Permitted Phases				4						2		
Actuated Green, G (s)		29.9			44.6						16.4	
Effective Green, g (s)		30.5			45.0						17.0	
Actuated g/C Ratio		0.44			0.64						0.24	
Clearance Time (s)		4.6			4.4						4.6	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		649			798						846	
v/s Ratio Prot		0.20			c0.19							
v/s Ratio Perm					c0.61						c0.16	
v/c Ratio		0.46			1.25						0.67	
Uniform Delay, d1		13.9			12.5						24.0	
Progression Factor		1.00			0.93						1.00	
Incremental Delay, d2		2.3			111.5						4.3	
Delay (s)		16.2			123.2						28.3	
Level of Service		B			F						C	
Approach Delay (s)		16.2			123.2			0.0			28.3	
Approach LOS		B			F			A			C	

Intersection Summary			
HCM Average Control Delay	77.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	E
c Critical Lane Group			



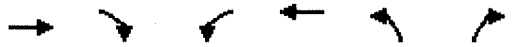
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		1648			1588			3449				
Flt Permitted		0.60			1.00			0.99				
Satd. Flow (perm)		985			1588			3449				
Volume (vph)	10	141	0	0	706	238	179	695	31	0	0	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	155	0	0	776	262	197	764	34	0	0	0
Lane Group Flow (vph)	0	166	0	0	1038	0	0	995	0	0	0	0
Confl. Peds. (#/hr)			8			8	19		7			
Heavy Vehicles (%)	20%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	0	0	8	8	0	5	5	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		33.6			33.6			27.6				
Effective Green, g (s)		34.0			34.0			28.0				
Actuated g/C Ratio		0.49			0.49			0.40				
Clearance Time (s)		4.4			4.4			4.4				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		478			771			1380				
v/s Ratio Prot					c0.65							
v/s Ratio Perm		0.17						c0.29				
v/c Ratio		0.35			1.35			0.72				
Uniform Delay, d1		11.1			18.0			17.7				
Progression Factor		1.28			0.58			1.00				
Incremental Delay, d2		1.8			162.1			3.3				
Delay (s)		16.0			172.5			21.0				
Level of Service		B			F			C				
Approach Delay (s)		16.0			172.5			21.0			0.0	
Approach LOS		B			F			C			A	

Intersection Summary			
HCM Average Control Delay	92.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	E
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1407			1655	1795	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	1407			1652	1795	
Volume (vph)	147	25	6	761	183	12
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	162	27	7	836	201	13
Lane Group Flow (vph)	189	0	0	843	214	0
Confl. Peds. (#/hr)		4				9
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Parking (#/hr)	5	5				
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	48.5			48.5	13.0	
Effective Green, g (s)	49.0			49.0	13.0	
Actuated g/C Ratio	0.70			0.70	0.19	
Clearance Time (s)	4.5			4.5	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	985			1156	333	
v/s Ratio Prot	0.13				c0.12	
v/s Ratio Perm				c0.51		
v/c Ratio	0.19			0.73	0.64	
Uniform Delay, d1	3.6			6.4	26.4	
Progression Factor	0.44			0.79	1.00	
Incremental Delay, d2	0.4			0.4	4.2	
Delay (s)	2.0			5.5	30.6	
Level of Service	A			A	C	
Approach Delay (s)	2.0			5.5	30.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	B

c Critical Lane Group



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1569			1654	1792	
Flt Permitted	1.00			0.99	0.96	
Satd. Flow (perm)	1569			1645	1792	
Volume (vph)	185	84	12	768	108	13
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	199	90	13	826	116	14
Lane Group Flow (vph)	289	0	0	839	130	0
Heavy Vehicles (%)	2%	3%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Turn Type			Perm			
Protected Phases	2 7			2	1	
Permitted Phases			2			
Actuated Green, G (s)	53.0			23.7	10.0	
Effective Green, g (s)	53.0			24.4	9.0	
Actuated g/C Ratio	0.76			0.35	0.13	
Clearance Time (s)				4.7	3.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)	1188			573	230	
v/s Ratio Prot	c0.18				c0.07	
v/s Ratio Perm				c0.51		
v/c Ratio	0.24			1.46	0.57	
Uniform Delay, d1	2.5			22.8	28.7	
Progression Factor	0.17			0.83	1.00	
Incremental Delay, d2	0.5			215.5	9.7	
Delay (s)	0.9			234.4	38.4	
Level of Service	A			F	D	
Approach Delay (s)	0.9			234.4	38.4	
Approach LOS	A			F	D	

Intersection Summary			
HCM Average Control Delay	160.5	HCM Level of Service	F
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	B

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Division Street & 26th Avenue 6/30/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.98			0.98	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1376			1644			1814			1847	
Flt Permitted		0.98			0.97			0.85			0.98	
Satd. Flow (perm)		1346			1602			1577			1813	
Volume (vph)	8	150	40	47	676	12	90	91	31	7	77	14
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	158	42	49	712	13	95	96	33	7	81	15
Lane Group Flow (vph)	0	208	0	0	774	0	0	224	0	0	103	0
Confl. Peds. (#/hr)			23			19			7			7
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		44.0			44.0			17.5			17.5	
Effective Green, g (s)		44.5			44.5			17.5			17.5	
Actuated g/C Ratio		0.64			0.64			0.25			0.25	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		856			1018			394			453	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.48			c0.14			0.06	
v/c Ratio		0.24			0.76			0.57			0.23	
Uniform Delay, d1		5.5			9.0			22.9			20.9	
Progression Factor		0.67			0.79			1.00			1.00	
Incremental Delay, d2		0.7			3.5			5.8			1.2	
Delay (s)		4.4			10.6			28.8			22.0	
Level of Service		A			B			C			C	
Approach Delay (s)		4.4			10.6			28.8			22.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.99			0.96	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		1430			1444			1843			1768	
Flt Permitted		0.95			1.00			0.88			0.87	
Satd. Flow (perm)		1366			1444			1656			1574	
Volume (vph)	13	171	4	1	682	12	29	39	5	32	19	24
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	180	4	1	718	13	31	41	5	34	20	25
Lane Group Flow (vph)	0	198	0	0	732	0	0	77	0	0	79	0
Confl. Peds. (#/hr)			4			8			1			1
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5						
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		44.5			44.5			16.5			16.5	
Effective Green, g (s)		45.0			45.0			17.0			17.0	
Actuated g/C Ratio		0.64			0.64			0.24			0.24	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		878			928			402			382	
v/s Ratio Prot												
v/s Ratio Perm		0.14			c0.51			0.05			c0.05	
v/c Ratio		0.23			0.79			0.19			0.21	
Uniform Delay, d1		5.2			9.1			21.0			21.1	
Progression Factor		0.81			1.42			1.00			1.00	
Incremental Delay, d2		0.6			3.6			1.1			1.2	
Delay (s)		4.8			16.4			22.1			22.3	
Level of Service		A			B			C			C	
Approach Delay (s)		4.8			16.4			22.1			22.3	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	A

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	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	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.99		1.00	0.99		1.00	0.97	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611			1000		1769	3000		1717	3000	
Flt Permitted		0.89			0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1447			1558		1769	3520		1717	3412	
Volume (vph)	30	143	35	53	480	47	110	852	79	86	498	104
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	152	37	56	511	50	117	906	84	91	530	111
Lane Group Flow (vph)	0	221	0	0	617	0	117	990	0	91	641	0
Confl. Peds. (#/hr)			4			8			4			22
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	3%	1%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	5	5	5	5	5	5
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		27.7			27.7		8.2	22.8		7.6	22.2	
Effective Green, g (s)		28.0			28.0		7.2	23.4		6.6	22.8	
Actuated g/C Ratio		0.40			0.40		0.10	0.33		0.09	0.33	
Clearance Time (s)		4.3			4.3		3.0	4.6		3.0	4.6	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		579			623		182	1003		162	977	
v/s Ratio Prot							c0.07	c0.33		0.05	0.21	
v/s Ratio Perm		0.15			c0.40							
v/c Ratio		0.38			0.99		0.64	0.99		0.56	0.66	
Uniform Delay, d1		14.9			20.9		30.2	23.1		30.3	20.2	
Progression Factor		0.49			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.9			33.8		7.5	25.5		4.4	3.4	
Delay (s)		9.2			54.6		37.7	48.6		34.7	23.7	
Level of Service		A			D		D	D		C	C	
Approach Delay (s)		9.2			54.6			47.5			25.0	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM Average Control Delay	39.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	E
c Critical Lane Group			

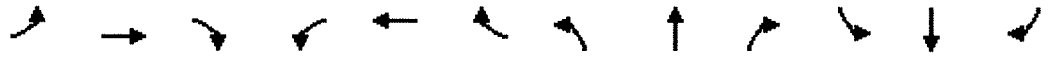
Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SEL	SER
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12
Total Lost time (s)			4.0	4.0			4.0		4.0	
Lane Util. Factor			1.00	1.00			1.00		1.00	
Frt			1.00	0.98			0.96		0.97	
Flt Protected			1.00	1.00			0.96		0.96	
Satd. Flow (prot)			1606	1617			1767		1773	
Flt Permitted			0.67	1.00			0.96		0.96	
Satd. Flow (perm)			1081	1617			1767		1773	
Volume (vph)	3	5	145	725	77	74	97	35	27	8
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	6	161	806	86	82	108	39	30	9
Lane Group Flow (vph)	0	0	170	974	0	0	147	0	39	0
Heavy Vehicles (%)	0%	8%	4%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0
Turn Type	Perm	Perm								
Protected Phases			2	6			4		3	
Permitted Phases	2	2								
Actuated Green, G (s)			23.7	36.7			16.4		4.2	
Effective Green, g (s)			24.4	37.4			16.4		4.2	
Actuated g/C Ratio			0.35	0.53			0.23		0.06	
Clearance Time (s)			4.7	4.7			4.0		4.0	
Vehicle Extension (s)			3.0	3.0			3.0		3.0	
Lane Grp Cap (vph)			377	864			414		106	
v/s Ratio Prot				c0.60			c0.08		c0.02	
v/s Ratio Perm			0.16							
v/c Ratio			0.45	1.13			0.36		0.37	
Uniform Delay, d1			17.6	16.3			22.4		31.6	
Progression Factor			0.91	0.92			1.00		1.00	
Incremental Delay, d2			3.8	58.9			0.5		2.2	
Delay (s)			19.9	73.9			22.9		33.8	
Level of Service			B	E			C		C	
Approach Delay (s)			19.9	73.9			22.9		33.8	
Approach LOS			B	E			C		C	

Intersection Summary			
HCM Average Control Delay	60.2	HCM Level of Service	E
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	C

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Division Street & 11th Avenue

6/30/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.94			1.00						1.00	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		2500			1646						3492	
Flt Permitted		1.00			0.30						0.99	
Satd. Flow (perm)		2500			509						3492	
Volume (vph)	0	385	292	94	169	0	0	0	0	216	765	8
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	414	314	101	182	0	0	0	0	232	823	9
Lane Group Flow (vph)	0	728	0	0	283	0	0	0	0	0	1064	0
Confl. Peds. (#/hr)			10			7				6		4
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	7	7	5	5	0	0	0	0	0	5	5
Turn Type				pm+pt						Perm		
Protected Phases		8		7	4						2	
Permitted Phases				4						2		
Actuated Green, G (s)		26.4			37.0						24.4	
Effective Green, g (s)		27.0			37.0						25.0	
Actuated g/C Ratio		0.39			0.53						0.36	
Clearance Time (s)		4.6			4.4						4.6	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		964			367						1247	
v/s Ratio Prot		0.29			c0.07							
v/s Ratio Perm					c0.34						c0.30	
v/c Ratio		0.76			0.77						0.85	
Uniform Delay, d1		18.6			13.1						20.8	
Progression Factor		1.00			1.03						1.00	
Incremental Delay, d2		5.5			13.4						7.5	
Delay (s)		24.1			27.0						28.3	
Level of Service		C			C						C	
Approach Delay (s)		24.1			27.0			0.0			28.3	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.8%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: Division Street & 12th Avenue

6/30/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.95			0.98				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		1658			1590			3455				
Flt Permitted		0.97			1.00			1.00				
Satd. Flow (perm)		1616			1590			3455				
Volume (vph)	30	571	0	0	211	106	47	632	92	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	601	0	0	222	112	49	665	97	0	0	0
Lane Group Flow (vph)	0	633	0	0	334	0	0	811	0	0	0	0
Confl. Peds. (#/hr)			20			4	7		8			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	0	0	5	5	0	5	5	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		31.6			31.6			29.6				
Effective Green, g (s)		32.0			32.0			30.0				
Actuated g/C Ratio		0.46			0.46			0.43				
Clearance Time (s)		4.4			4.4			4.4				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		739			727			1481				
v/s Ratio Prot					0.21							
v/s Ratio Perm		c0.39						c0.23				
v/c Ratio		0.86			0.46			0.55				
Uniform Delay, d1		17.0			13.1			14.9				
Progression Factor		0.64			0.47			1.00				
Incremental Delay, d2		7.9			2.1			1.5				
Delay (s)		18.8			8.2			16.4				
Level of Service		B			A			B				
Approach Delay (s)		18.8			8.2			16.4			0.0	
Approach LOS		B			A			B			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	D
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.96	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	1443			1674	1745	
Flt Permitted	1.00			0.99	0.97	
Satd. Flow (perm)	1443			1656	1745	
Volume (vph)	630	33	7	280	35	15
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	663	35	7	295	37	16
Lane Group Flow (vph)	698	0	0	302	53	0
Confl. Peds. (#/hr)		1				14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Parking (#/hr)	5	5				
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	55.5			55.5	6.0	
Effective Green, g (s)	56.0			56.0	6.0	
Actuated g/C Ratio	0.80			0.80	0.09	
Clearance Time (s)	4.5			4.5	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1154			1325	150	
v/s Ratio Prot	c0.48				c0.03	
v/s Ratio Perm				0.18		
v/c Ratio	0.60			0.23	0.35	
Uniform Delay, d1	2.7			1.7	30.2	
Progression Factor	0.68			0.61	1.00	
Incremental Delay, d2	1.3			0.3	1.4	
Delay (s)	3.2			1.4	31.6	
Level of Service	A			A	C	
Approach Delay (s)	3.2			1.4	31.6	
Approach LOS	A			A	C	

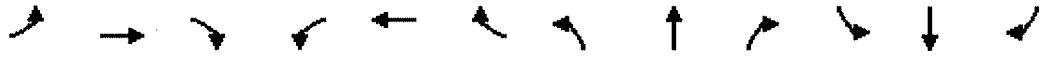
Intersection Summary			
HCM Average Control Delay	4.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.97			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	1619			1672	1756	
Flt Permitted	1.00			0.95	0.97	
Satd. Flow (perm)	1619			1600	1756	
Volume (vph)	663	157	15	337	115	57
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	705	167	16	359	122	61
Lane Group Flow (vph)	872	0	0	375	183	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Turn Type			Perm			
Protected Phases	2 7			2	1	
Permitted Phases			2			
Actuated Green, G (s)	53.6			25.9	9.4	
Effective Green, g (s)	53.6			26.6	8.4	
Actuated g/C Ratio	0.77			0.38	0.12	
Clearance Time (s)				4.7	3.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)	1240			608	211	
v/s Ratio Prot	c0.54				c0.10	
v/s Ratio Perm				0.23		
v/c Ratio	0.70			0.62	0.87	
Uniform Delay, d1	4.2			17.6	30.3	
Progression Factor	0.50			0.79	1.00	
Incremental Delay, d2	1.1			4.1	29.1	
Delay (s)	3.2			18.1	59.3	
Level of Service	A			B	E	
Approach Delay (s)	3.2			18.1	59.3	
Approach LOS	A			B	E	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	B

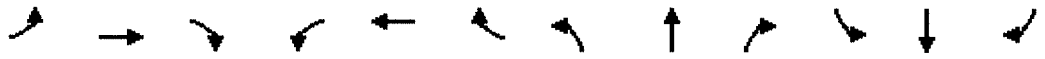
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.97			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1424			1650			1799			1828	
Flt Permitted		0.99			0.91			0.91			0.96	
Satd. Flow (perm)		1409			1515			1655			1768	
Volume (vph)	14	545	73	41	377	27	58	120	62	13	95	24
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	574	77	43	397	28	61	126	65	14	100	25
Lane Group Flow (vph)	0	666	0	0	468	0	0	252	0	0	139	0
Confl. Peds. (#/hr)			5			10			11			13
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		44.0			44.0			17.5			17.5	
Effective Green, g (s)		44.5			44.5			17.5			17.5	
Actuated g/C Ratio		0.64			0.64			0.25			0.25	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		896			963			414			442	
v/s Ratio Prot												
v/s Ratio Perm		c0.47			0.31			c0.15			0.08	
v/c Ratio		0.74			0.49			0.61			0.31	
Uniform Delay, d1		8.8			6.7			23.2			21.4	
Progression Factor		0.86			0.24			1.00			1.00	
Incremental Delay, d2		3.9			1.5			6.5			1.9	
Delay (s)		11.5			3.2			29.7			23.2	
Level of Service		B			A			C			C	
Approach Delay (s)		11.5			3.2			29.7			23.2	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	F

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.96			0.96	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		1448			1446			1788			1781	
Flt Permitted		0.97			0.97			0.99			0.90	
Satd. Flow (perm)		1408			1400			1777			1638	
Volume (vph)	30	663	8	19	416	32	2	27	12	33	39	27
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	698	8	20	438	34	2	28	13	35	41	28
Lane Group Flow (vph)	0	738	0	0	492	0	0	43	0	0	104	0
Confl. Peds. (#/hr)			8			5			14			8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5				0		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		44.5			44.5			16.5			16.5	
Effective Green, g (s)		45.0			45.0			17.0			17.0	
Actuated g/C Ratio		0.64			0.64			0.24			0.24	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		905			900			432			398	
v/s Ratio Prot												
v/s Ratio Perm		c0.52			0.35			0.02			c0.06	
v/c Ratio		0.82			0.55			0.10			0.26	
Uniform Delay, d1		9.4			6.9			20.6			21.4	
Progression Factor		1.01			1.00			1.00			1.00	
Incremental Delay, d2		6.3			2.4			0.5			1.6	
Delay (s)		15.8			9.3			21.0			23.0	
Level of Service		B			A			C			C	
Approach Delay (s)		15.8			9.3			21.0			23.0	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	D

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	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	
Frpb, ped/bikes		0.99			1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1617			1613		1769	3000		1769	3000	
Flt Permitted		0.87			0.80		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1418			1299		1769	3463		1769	3466	
Volume (vph)	84	477	68	67	283	74	80	696	111	172	861	104
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	88	497	71	70	295	77	83	725	116	179	897	108
Lane Group Flow (vph)	0	656	0	0	442	0	83	841	0	179	1005	0
Confl. Peds. (#/hr)			28			4			14			37
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	5	5	5	5	5	5
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		45.7			45.7		6.8	28.5		13.9	35.6	
Effective Green, g (s)		46.0			46.0		5.8	29.1		12.9	36.2	
Actuated g/C Ratio		0.46			0.46		0.06	0.29		0.13	0.36	
Clearance Time (s)		4.3			4.3		3.0	4.6		3.0	4.6	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		652			598		103	873		228	1086	
v/s Ratio Prot							0.05	0.28		c0.10	c0.34	
v/s Ratio Perm		c0.46			0.34							
v/c Ratio		1.01			0.74		0.81	0.96		0.79	0.93	
Uniform Delay, d1		27.0			22.1		46.5	34.9		42.2	30.6	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		36.8			8.0		35.2	22.8		16.1	14.4	
Delay (s)		63.8			30.1		81.7	57.7		58.3	45.0	
Level of Service		E			C		F	E		E	D	
Approach Delay (s)		63.8			30.1			59.8			47.0	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM Average Control Delay	51.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.9%	ICU Level of Service	F
c Critical Lane Group			

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SBR2	SEL2	SEL	SER
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
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	0.95			0.97				1.00	
Flt Protected			1.00	1.00			0.96				0.95	
Satd. Flow (prot)			1659	1595			1775				1734	
Flt Permitted			0.98	1.00			0.96				0.95	
Satd. Flow (perm)			1627	1595			1775				1734	
Volume (vph)	2	17	569	292	54	109	157	43	1	15	105	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2	18	612	314	58	117	169	46	1	16	113	0
Lane Group Flow (vph)	0	0	632	489	0	0	216	0	0	0	129	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Turn Type	Perm	Perm								Perm		
Protected Phases			2	6			4				3	
Permitted Phases	2	2								3		
Actuated Green, G (s)			25.9	38.0			12.0				7.0	
Effective Green, g (s)			26.6	39.0			12.0				7.0	
Actuated g/C Ratio			0.38	0.56			0.17				0.10	
Clearance Time (s)			4.7	5.0			4.0				4.0	
Vehicle Extension (s)			3.0	3.0			3.0				3.0	
Lane Grp Cap (vph)			618	889			304				173	
v/s Ratio Prot				c0.31			c0.12					
v/s Ratio Perm			c0.39								c0.07	
v/c Ratio			1.02	0.55			0.71				0.75	
Uniform Delay, d1			21.7	9.9			27.4				30.6	
Progression Factor			0.55	0.22			1.00				1.00	
Incremental Delay, d2			39.6	1.9			7.6				16.0	
Delay (s)			51.5	4.1			35.0				46.6	
Level of Service			D	A			C				D	
Approach Delay (s)			51.5	4.1			35.0				46.6	
Approach LOS			D	A			C				D	

Intersection Summary			
HCM Average Control Delay	32.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	C

c Critical Lane Group

Appendix E
Synchro Analysis
One-Lane Optimized Timings

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.92			1.00						1.00	
Flt Protected		1.00			0.98						1.00	
Satd. Flow (prot)		1490			1626						3482	
Flt Permitted		1.00			0.75						1.00	
Satd. Flow (perm)		1490			1242						3482	
Volume (vph)	0	105	158	316	569	0	0	0	0	46	453	8
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	0	118	178	355	639	0	0	0	0	52	509	9
Lane Group Flow (vph)	0	296	0	0	994	0	0	0	0	0	570	0
Confl. Peds. (#/hr)			12			2				5		10
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	2%	0%
Bus Blockages (#/hr)	0	5	5	8	8	0	0	0	0	0	5	5
Turn Type				Perm						Perm		
Protected Phases		8			4						2	
Permitted Phases				4						2		
Actuated Green, G (s)		45.4			45.6						15.4	
Effective Green, g (s)		46.0			46.0						16.0	
Actuated g/C Ratio		0.66			0.66						0.23	
Clearance Time (s)		4.6			4.4						4.6	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		979			816						796	
v/s Ratio Prot		0.20										
v/s Ratio Perm					c0.80						c0.16	
v/c Ratio		0.30			1.22						0.72	
Uniform Delay, d1		5.1			12.0						24.9	
Progression Factor		1.00			0.90						1.00	
Incremental Delay, d2		0.8			99.3						5.5	
Delay (s)		5.9			110.1						30.4	
Level of Service		A			F						C	
Approach Delay (s)		5.9			110.1			0.0			30.4	
Approach LOS		A			F			A			C	

Intersection Summary			
HCM Average Control Delay	69.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.0%	ICU Level of Service	E
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
2: Division Street & 12th Avenue 6/30/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			0.99				
Frt		1.00			0.97			0.99				
Flt Protected		1.00			1.00			0.99				
Satd. Flow (prot)		1648			1588			3449				
Flt Permitted		0.82			1.00			0.99				
Satd. Flow (perm)		1352			1588			3449				
Volume (vph)	10	141	0	0	706	238	179	695	31	0	0	0
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	155	0	0	776	262	197	764	34	0	0	0
Lane Group Flow (vph)	0	166	0	0	1038	0	0	995	0	0	0	0
Confl. Peds. (#/hr)			8			8	19		7			
Heavy Vehicles (%)	20%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	0	0	8	8	0	5	5	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		42.5			42.5			18.7				
Effective Green, g (s)		42.9			42.9			19.1				
Actuated g/C Ratio		0.61			0.61			0.27				
Clearance Time (s)		4.4			4.4			4.4				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		829			973			941				
v/s Ratio Prot					c0.65							
v/s Ratio Perm		0.12						c0.29				
v/c Ratio		0.20			1.07			1.06				
Uniform Delay, d1		6.0			13.6			25.4				
Progression Factor		1.01			0.50			1.00				
Incremental Delay, d2		0.5			44.3			45.7				
Delay (s)		6.5			51.0			71.2				
Level of Service		A			D			E				
Approach Delay (s)		6.5			51.0			71.2			0.0	
Approach LOS		A			D			E			A	

Intersection Summary			
HCM Average Control Delay	56.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	E
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.98			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1407			1655	1795	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	1407			1652	1795	
Volume (vph)	147	25	6	761	183	12
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	162	27	7	836	201	13
Lane Group Flow (vph)	189	0	0	843	214	0
Confl. Peds. (#/hr)		4				9
Heavy Vehicles (%)	2%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Parking (#/hr)	5	5				
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	48.7			48.7	12.8	
Effective Green, g (s)	49.2			49.2	12.8	
Actuated g/C Ratio	0.70			0.70	0.18	
Clearance Time (s)	4.5			4.5	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	989			1161	328	
v/s Ratio Prot	0.13				c0.12	
v/s Ratio Perm				c0.51		
v/c Ratio	0.19			0.73	0.65	
Uniform Delay, d1	3.6			6.3	26.5	
Progression Factor	0.72			0.93	1.00	
Incremental Delay, d2	0.4			1.4	4.6	
Delay (s)	3.0			7.3	31.1	
Level of Service	A			A	C	
Approach Delay (s)	3.0			7.3	31.1	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	B

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.96			1.00	0.99	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	1569			1654	1792	
Flt Permitted	1.00			0.99	0.96	
Satd. Flow (perm)	1569			1645	1792	
Volume (vph)	185	84	12	768	108	13
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	199	90	13	826	116	14
Lane Group Flow (vph)	289	0	0	839	130	0
Heavy Vehicles (%)	2%	3%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	8	8	0	0
Turn Type			Perm			
Protected Phases	2 7			2	1	
Permitted Phases			2			
Actuated Green, G (s)	53.0			26.9	10.0	
Effective Green, g (s)	53.0			27.6	9.0	
Actuated g/C Ratio	0.76			0.39	0.13	
Clearance Time (s)				4.7	3.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)	1188			649	230	
v/s Ratio Prot	c0.18				c0.07	
v/s Ratio Perm				c0.51		
v/c Ratio	0.24			1.29	0.57	
Uniform Delay, d1	2.5			21.2	28.7	
Progression Factor	0.62			0.75	1.00	
Incremental Delay, d2	0.5			139.9	9.7	
Delay (s)	2.0			155.7	38.4	
Level of Service	A			F	D	
Approach Delay (s)	2.0			155.7	38.4	
Approach LOS	A			F	D	

Intersection Summary			
HCM Average Control Delay	108.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	B

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			1.00			0.98			0.98	
Flt Protected		1.00			1.00			0.98			1.00	
Satd. Flow (prot)		1376			1644			1814			1847	
Flt Permitted		0.98			0.97			0.85			0.98	
Satd. Flow (perm)		1346			1603			1567			1811	
Volume (vph)	8	150	40	47	676	12	90	91	31	7	77	14
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	8	158	42	49	712	13	95	96	33	7	81	15
Lane Group Flow (vph)	0	208	0	0	774	0	0	224	0	0	103	0
Confl. Peds. (#/hr)			23			19			7			7
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		45.5			45.5			16.0			16.0	
Effective Green, g (s)		46.0			46.0			16.0			16.0	
Actuated g/C Ratio		0.66			0.66			0.23			0.23	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		885			1053			358			414	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.48			c0.14			0.06	
v/c Ratio		0.24			0.74			0.63			0.25	
Uniform Delay, d1		4.9			8.0			24.3			22.1	
Progression Factor		0.52			0.79			1.00			1.00	
Incremental Delay, d2		0.6			3.2			8.0			1.4	
Delay (s)		3.1			9.5			32.3			23.5	
Level of Service		A			A			C			C	
Approach Delay (s)		3.1			9.5			32.3			23.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D

c Critical Lane Group

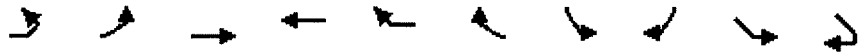
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			1.00			0.99			0.96	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		1430			1444			1843			1768	
Flt Permitted		0.95			1.00			0.87			0.86	
Satd. Flow (perm)		1367			1444			1643			1560	
Volume (vph)	13	171	4	1	682	12	29	39	5	32	19	24
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	14	180	4	1	718	13	31	41	5	34	20	25
Lane Group Flow (vph)	0	198	0	0	732	0	0	77	0	0	79	0
Confl. Peds. (#/hr)			4			8			1			1
Heavy Vehicles (%)	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5						
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		47.0			47.0			14.0			14.0	
Effective Green, g (s)		47.5			47.5			14.5			14.5	
Actuated g/C Ratio		0.68			0.68			0.21			0.21	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		928			980			340			323	
v/s Ratio Prot												
v/s Ratio Perm		0.14			c0.51			0.05			c0.05	
v/c Ratio		0.21			0.75			0.23			0.24	
Uniform Delay, d1		4.2			7.3			23.1			23.2	
Progression Factor		0.82			1.52			1.00			1.00	
Incremental Delay, d2		0.5			2.6			1.5			1.8	
Delay (s)		4.0			13.8			24.6			25.0	
Level of Service		A			B			C			C	
Approach Delay (s)		4.0			13.8			24.6			25.0	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	A

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑↑↱			↑↑↱	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	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	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.98			0.99		1.00	0.99		1.00	0.97	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1611			1000		1769	3000		1717	3000	
Flt Permitted		0.90			0.95		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1455			1559		1769	3520		1717	3412	
Volume (vph)	30	143	35	53	480	47	110	852	79	86	498	104
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	152	37	56	511	50	117	906	84	91	530	111
Lane Group Flow (vph)	0	221	0	0	617	0	117	990	0	91	641	0
Confl. Peds. (#/hr)			4			8			4			22
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	0%	0%	0%	3%	1%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	5	5	5	5	5	5
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		28.7			28.7		6.4	24.4		5.0	23.0	
Effective Green, g (s)		29.0			29.0		5.4	25.0		4.0	23.6	
Actuated g/C Ratio		0.41			0.41		0.08	0.36		0.06	0.34	
Clearance Time (s)		4.3			4.3		3.0	4.6		3.0	4.6	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		603			646		136	1071		98	1011	
v/s Ratio Prot							c0.07	c0.33		0.05	0.21	
v/s Ratio Perm		0.15			c0.40							
v/c Ratio		0.37			0.96		0.86	0.92		0.93	0.63	
Uniform Delay, d1		14.2			19.9		31.9	21.6		32.9	19.6	
Progression Factor		0.49			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		1.7			25.9		39.0	14.4		67.3	3.0	
Delay (s)		8.6			45.8		71.0	36.0		100.2	22.6	
Level of Service		A			D		E	D		F	C	
Approach Delay (s)		8.6			45.8			39.7			32.2	
Approach LOS		A			D			D			C	

Intersection Summary			
HCM Average Control Delay	36.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	E
c Critical Lane Group			



Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SEL	SER
Lane Configurations										
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12
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	0.98			0.96		0.97	
Flt Protected			1.00	1.00			0.96		0.96	
Satd. Flow (prot)			1606	1617			1767		1773	
Flt Permitted			0.90	1.00			0.96		0.96	
Satd. Flow (perm)			1453	1617			1767		1773	
Volume (vph)	3	5	145	725	77	74	97	35	27	8
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	6	161	806	86	82	108	39	30	9
Lane Group Flow (vph)	0	0	170	974	0	0	147	0	39	0
Heavy Vehicles (%)	0%	8%	4%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	5	5	5	8	8	8	0	0	0	0
Turn Type	Perm	Perm								
Protected Phases			2	6			4		3	
Permitted Phases	2	2								
Actuated Green, G (s)			26.9	39.9			14.1		3.3	
Effective Green, g (s)			27.6	40.6			14.1		3.3	
Actuated g/C Ratio			0.39	0.58			0.20		0.05	
Clearance Time (s)			4.7	4.7			4.0		4.0	
Vehicle Extension (s)			3.0	3.0			3.0		3.0	
Lane Grp Cap (vph)			573	938			356		84	
v/s Ratio Prot				c0.60			c0.08		c0.02	
v/s Ratio Perm			0.12							
v/c Ratio			0.30	1.04			0.41		0.46	
Uniform Delay, d1			14.5	14.7			24.3		32.5	
Progression Factor			1.15	0.81			1.00		1.00	
Incremental Delay, d2			1.3	21.1			0.8		4.0	
Delay (s)			18.1	33.0			25.1		36.5	
Level of Service			B	C			C		D	
Approach Delay (s)			18.1	33.0			25.1		36.5	
Approach LOS			B	C			C		D	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	C

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Division Street & 11th Avenue

6/30/2009

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0						4.0	
Lane Util. Factor		1.00			1.00						0.95	
Frpb, ped/bikes		0.99			1.00						1.00	
Flpb, ped/bikes		1.00			1.00						1.00	
Frt		0.94			1.00						1.00	
Flt Protected		1.00			0.98						0.99	
Satd. Flow (prot)		2500			1646						3492	
Flt Permitted		1.00			0.44						0.99	
Satd. Flow (perm)		2500			730						3492	
Volume (vph)	0	385	292	94	169	0	0	0	0	216	765	8
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	414	314	101	182	0	0	0	0	232	823	9
Lane Group Flow (vph)	0	728	0	0	283	0	0	0	0	0	1064	0
Confl. Peds. (#/hr)			10			7				6		4
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Bus Blockages (#/hr)	0	7	7	5	5	0	0	0	0	0	5	5
Turn Type				Perm						Perm		
Protected Phases		8			4						2	
Permitted Phases				4						2		
Actuated Green, G (s)		35.4			35.6						25.4	
Effective Green, g (s)		36.0			36.0						26.0	
Actuated g/C Ratio		0.51			0.51						0.37	
Clearance Time (s)		4.6			4.4						4.6	
Vehicle Extension (s)		3.0			3.0						3.0	
Lane Grp Cap (vph)		1286			375						1297	
v/s Ratio Prot		0.29										
v/s Ratio Perm					c0.39						c0.30	
v/c Ratio		0.57			0.75						0.82	
Uniform Delay, d1		11.6			13.5						19.9	
Progression Factor		1.00			1.19						1.00	
Incremental Delay, d2		1.8			12.3						5.9	
Delay (s)		13.5			28.3						25.8	
Level of Service		B			C						C	
Approach Delay (s)		13.5			28.3			0.0			25.8	
Approach LOS		B			C			A			C	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.8%	ICU Level of Service	F
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0				
Lane Util. Factor		1.00			1.00			0.95				
Frpb, ped/bikes		1.00			0.99			1.00				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.95			0.98				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		1658			1590			3455				
Flt Permitted		0.97			1.00			1.00				
Satd. Flow (perm)		1618			1590			3455				
Volume (vph)	30	571	0	0	211	106	47	632	92	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	601	0	0	222	112	49	665	97	0	0	0
Lane Group Flow (vph)	0	633	0	0	334	0	0	811	0	0	0	0
Confl. Peds. (#/hr)			20			4	7		8			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	0	0	5	5	0	5	5	0	0	0
Turn Type	Perm						Perm					
Protected Phases		2			2			4				
Permitted Phases	2						4					
Actuated Green, G (s)		39.6			39.6			21.6				
Effective Green, g (s)		40.0			40.0			22.0				
Actuated g/C Ratio		0.57			0.57			0.31				
Clearance Time (s)		4.4			4.4			4.4				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		925			909			1086				
v/s Ratio Prot					0.21							
v/s Ratio Perm		c0.39						c0.23				
v/c Ratio		0.68			0.37			0.75				
Uniform Delay, d1		10.6			8.1			21.5				
Progression Factor		0.66			0.33			1.00				
Incremental Delay, d2		3.1			1.1			4.7				
Delay (s)		10.1			3.8			26.2				
Level of Service		B			A			C				
Approach Delay (s)		10.1			3.8			26.2			0.0	
Approach LOS		B			A			C			A	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.0%	ICU Level of Service	D
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: Division Street & 17th Avenue

6/30/2009

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frpb, ped/bikes	1.00			1.00	0.99	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	0.99			1.00	0.96	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	1443			1674	1745	
Flt Permitted	1.00			0.99	0.97	
Satd. Flow (perm)	1443			1656	1745	
Volume (vph)	630	33	7	280	35	15
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	663	35	7	295	37	16
Lane Group Flow (vph)	698	0	0	302	53	0
Confl. Peds. (#/hr)		1				14
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Parking (#/hr)	5	5				
Turn Type			Perm			
Protected Phases	2			2	4	
Permitted Phases			2			
Actuated Green, G (s)	55.5			55.5	6.0	
Effective Green, g (s)	56.0			56.0	6.0	
Actuated g/C Ratio	0.80			0.80	0.09	
Clearance Time (s)	4.5			4.5	4.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	1154			1325	150	
v/s Ratio Prot	c0.48				c0.03	
v/s Ratio Perm				0.18		
v/c Ratio	0.60			0.23	0.35	
Uniform Delay, d1	2.7			1.7	30.2	
Progression Factor	0.35			0.61	1.00	
Incremental Delay, d2	1.7			0.3	1.4	
Delay (s)	2.6			1.4	31.6	
Level of Service	A			A	C	
Approach Delay (s)	2.6			1.4	31.6	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	3.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Division Street & 21st Avenue 6/30/2009

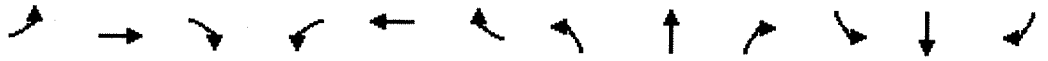
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	12	12
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00	
Frt	0.97			1.00	0.95	
Flt Protected	1.00			1.00	0.97	
Satd. Flow (prot)	1619			1672	1756	
Flt Permitted	1.00			0.95	0.97	
Satd. Flow (perm)	1619			1600	1756	
Volume (vph)	663	157	15	337	115	57
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	705	167	16	359	122	61
Lane Group Flow (vph)	872	0	0	375	183	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	5	5	0	0
Turn Type			Perm			
Protected Phases	2 7			2	1	
Permitted Phases			2			
Actuated Green, G (s)	53.6			25.9	9.4	
Effective Green, g (s)	53.6			26.6	8.4	
Actuated g/C Ratio	0.77			0.38	0.12	
Clearance Time (s)				4.7	3.0	
Vehicle Extension (s)				3.0	3.0	
Lane Grp Cap (vph)	1240			608	211	
v/s Ratio Prot	c0.54				c0.10	
v/s Ratio Perm				0.23		
v/c Ratio	0.70			0.62	0.87	
Uniform Delay, d1	4.2			17.6	30.3	
Progression Factor	0.51			0.79	1.00	
Incremental Delay, d2	1.1			4.1	29.1	
Delay (s)	3.2			18.1	59.3	
Level of Service	A			B	E	
Approach Delay (s)	3.2			18.1	59.3	
Approach LOS	A			B	E	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	B

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Division Street & 26th Avenue

6/30/2009



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.97			0.98	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1424			1650			1799			1828	
Flt Permitted		0.99			0.91			0.91			0.96	
Satd. Flow (perm)		1409			1515			1655			1768	
Volume (vph)	14	545	73	41	377	27	58	120	62	13	95	24
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	15	574	77	43	397	28	61	126	65	14	100	25
Lane Group Flow (vph)	0	666	0	0	468	0	0	252	0	0	139	0
Confl. Peds. (#/hr)			5			10			11			13
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	0	5	5									
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		44.0			44.0			17.5			17.5	
Effective Green, g (s)		44.5			44.5			17.5			17.5	
Actuated g/C Ratio		0.64			0.64			0.25			0.25	
Clearance Time (s)		4.5			4.5			4.0			4.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		896			963			414			442	
v/s Ratio Prot												
v/s Ratio Perm		c0.47			0.31			c0.15			0.08	
v/c Ratio		0.74			0.49			0.61			0.31	
Uniform Delay, d1		8.8			6.7			23.2			21.4	
Progression Factor		0.86			0.43			1.00			1.00	
Incremental Delay, d2		3.9			1.5			6.5			1.9	
Delay (s)		11.5			4.4			29.7			23.2	
Level of Service		B			A			C			C	
Approach Delay (s)		11.5			4.4			29.7			23.2	
Approach LOS		B			A			C			C	

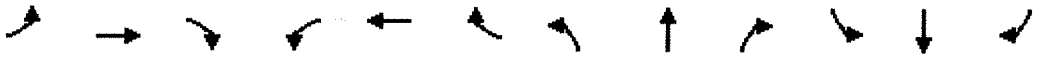
Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.9%	ICU Level of Service	F

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.98			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		1.00			0.99			0.96			0.96	
Flt Protected		1.00			1.00			1.00			0.98	
Satd. Flow (prot)		1448			1446			1788			1781	
Flt Permitted		0.97			0.97			0.99			0.90	
Satd. Flow (perm)		1409			1400			1775			1628	
Volume (vph)	30	663	8	19	416	32	2	27	12	33	39	27
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	698	8	20	438	34	2	28	13	35	41	28
Lane Group Flow (vph)	0	738	0	0	492	0	0	43	0	0	104	0
Confl. Peds. (#/hr)			8			5			14			8
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Parking (#/hr)	5	5	5	5	5	5				0		
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		47.0			47.0			14.0			14.0	
Effective Green, g (s)		47.5			47.5			14.5			14.5	
Actuated g/C Ratio		0.68			0.68			0.21			0.21	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		956			950			368			337	
v/s Ratio Prot												
v/s Ratio Perm		c0.52			0.35			0.02			c0.06	
v/c Ratio		0.77			0.52			0.12			0.31	
Uniform Delay, d1		7.6			5.6			22.5			23.5	
Progression Factor		1.04			1.00			1.00			1.00	
Incremental Delay, d2		4.7			2.0			0.6			2.4	
Delay (s)		12.6			7.6			23.2			25.9	
Level of Service		B			A			C			C	
Approach Delay (s)		12.6			7.6			23.2			25.9	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	D

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	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	
Frpb, ped/bikes		0.99			1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.98		1.00	0.98		1.00	0.98	
Flt Protected		0.99			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1617			1613		1769	3000		1769	3000	
Flt Permitted		0.87			0.81		0.95	1.00		0.95	1.00	
Satd. Flow (perm)		1424			1309		1769	3463		1769	3466	
Volume (vph)	84	477	68	67	283	74	80	696	111	172	861	104
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	88	497	71	70	295	77	83	725	116	179	897	108
Lane Group Flow (vph)	0	656	0	0	442	0	83	841	0	179	1005	0
Confl. Peds. (#/hr)			28			4			14			37
Heavy Vehicles (%)	0%	0%	0%	0%	0%	2%	0%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	5	5	5	5	5	5
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)		46.7			46.7		6.0	29.4		12.0	35.4	
Effective Green, g (s)		47.0			47.0		5.0	30.0		11.0	36.0	
Actuated g/C Ratio		0.47			0.47		0.05	0.30		0.11	0.36	
Clearance Time (s)		4.3			4.3		3.0	4.6		3.0	4.6	
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		669			615		88	900		195	1080	
v/s Ratio Prot							0.05	0.28		c0.10	c0.34	
v/s Ratio Perm		c0.46			0.34							
v/c Ratio		0.98			0.72		0.94	0.93		0.92	0.93	
Uniform Delay, d1		26.1			21.2		47.4	34.0		44.1	30.8	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		30.4			7.1		76.7	17.8		41.6	15.1	
Delay (s)		56.4			28.3		124.1	51.8		85.6	45.9	
Level of Service		E			C		F	D		F	D	
Approach Delay (s)		56.4			28.3			58.3			51.9	
Approach LOS		E			C			E			D	

Intersection Summary			
HCM Average Control Delay	51.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.9%	ICU Level of Service	F
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: Division Street & 20th Avenue 6/30/2009

Movement	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SBR2	SEL2	SEL	SER
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	9	9	9	9	12	12	12	12	12	12
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	0.95			0.97				1.00	
Flt Protected			1.00	1.00			0.96				0.95	
Satd. Flow (prot)			1659	1595			1775				1734	
Flt Permitted			0.98	1.00			0.96				0.95	
Satd. Flow (perm)			1627	1595			1775				1734	
Volume (vph)	2	17	569	292	54	109	157	43	1	15	105	0
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	2	18	612	314	58	117	169	46	1	16	113	0
Lane Group Flow (vph)	0	0	632	489	0	0	216	0	0	0	129	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%
Bus Blockages (#/hr)	7	7	7	5	5	5	0	0	0	0	0	0
Turn Type	Perm	Perm								Perm		
Protected Phases			2	6			4				3	
Permitted Phases	2	2								3		
Actuated Green, G (s)			25.9	38.0			12.0				7.0	
Effective Green, g (s)			26.6	39.0			12.0				7.0	
Actuated g/C Ratio			0.38	0.56			0.17				0.10	
Clearance Time (s)			4.7	5.0			4.0				4.0	
Vehicle Extension (s)			3.0	3.0			3.0				3.0	
Lane Grp Cap (vph)			618	889			304				173	
v/s Ratio Prot				c0.31			c0.12					
v/s Ratio Perm			c0.39								c0.07	
v/c Ratio			1.02	0.55			0.71				0.75	
Uniform Delay, d1			21.7	9.9			27.4				30.6	
Progression Factor			0.62	0.22			1.00				1.00	
Incremental Delay, d2			39.6	1.9			7.6				16.0	
Delay (s)			53.0	4.1			35.0				46.6	
Level of Service			D	A			C				D	
Approach Delay (s)			53.0	4.1			35.0				46.6	
Approach LOS			D	A			C				D	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	C

c Critical Lane Group