TRAFFIC IMPACT STUDY

For

Colfax & Quentin Hotel
Aurora, Colorado

February 2020

Prepared for:

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I. Introduction

Project Overview

This traffic impact study addresses the capacity, geometric, and control requirements associated with the development entitled Colfax & Quentin Hotel.

This proposed commercial development consists of hotel building with ancillary uses including general office, retail, and restaurant spaces. The development is located at the southeast corner of the intersection of Colfax Avenue (SH 40) and Quentin Street in Aurora, Colorado. It is to be noted that this development is a part of an overall Master Development Plan for the properties between Peoria Street and Scranton Street on the south side of Colfax Avenue. This traffic analysis is provided as an addition to the previously approved analyses preformed for the adjacent properties entitled Fitzsimons Gateway Hotel, prepared by CivTrans Engineering Inc. and dated March 2019, and The Plaza Fitzsimons, prepared by Matrix Design Group and dated June 2019.

Study Area Boundaries

The study area to be examined in this analysis encompasses the Colfax Avenue intersection with Quentin Street, and proposed site accesses.

Figure 1 illustrates location of the site and study intersections.

Site Description

The proposed development is understood to entail the new construction of a hotel building supporting 100 rooms and space for various ancillary uses including approximately 16,700 square feet of general office, 15,000 square feet of retail, and 4,500 square feet of restaurant.

Land for the development is currently occupied by a disused parking lot and is surrounded by a mix of residential, commercial, city park, and medical land uses.

Proposed access to the development is provided at the following locations: One full movement access on Colfax Avenue (referred to as Access A) proposed as a southern extension of Quentin Street, and one right-in/right-out access onto Colfax Avenue (referred to as Access B) located east of Access A.

For purposes of this study, it is anticipated that development construction would be completed by end of Year 2021.

A conceptual site plan, as prepared by Proof Civil, is shown on Figure 2. This plan is provided for illustrative purposes.
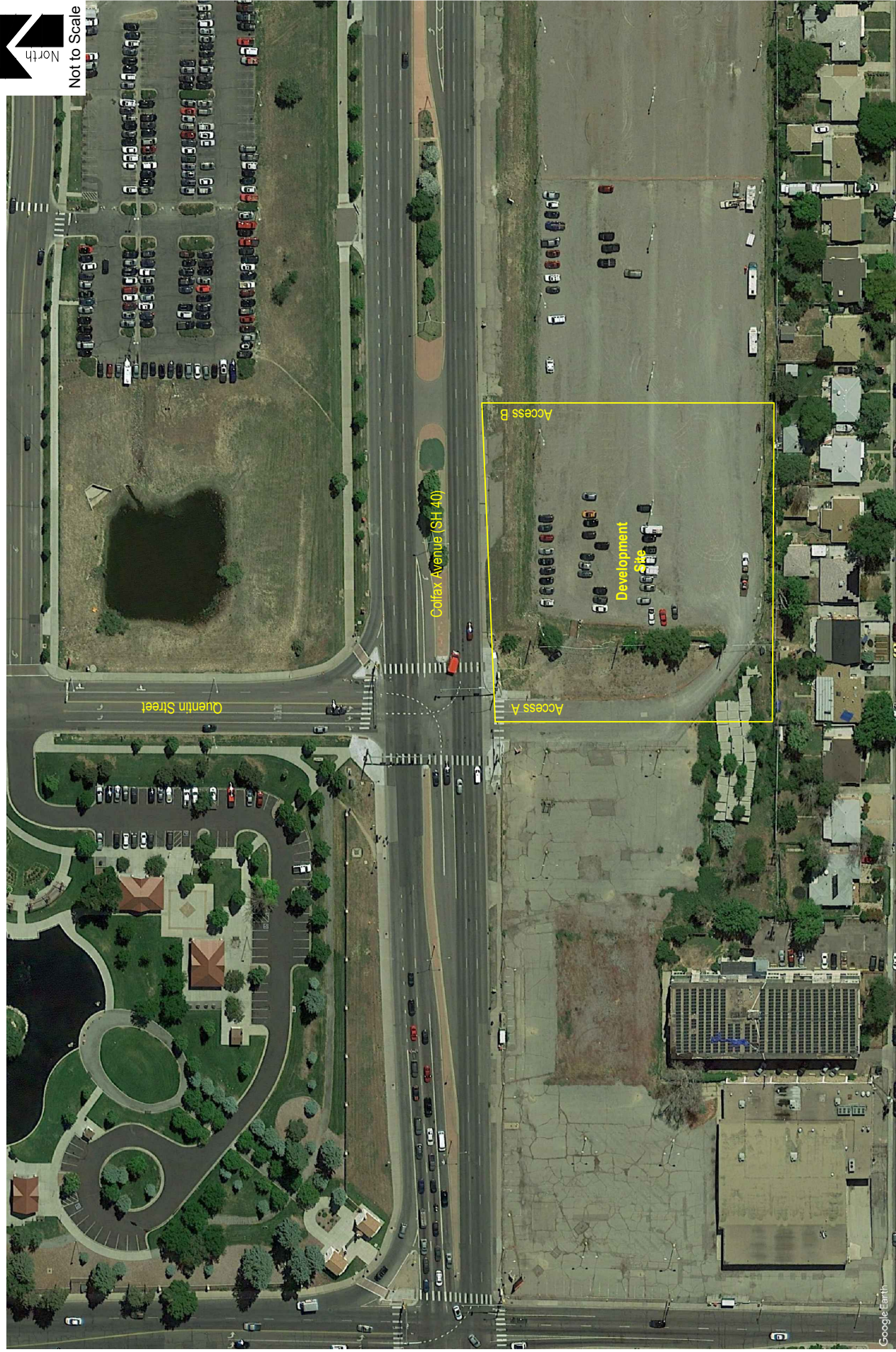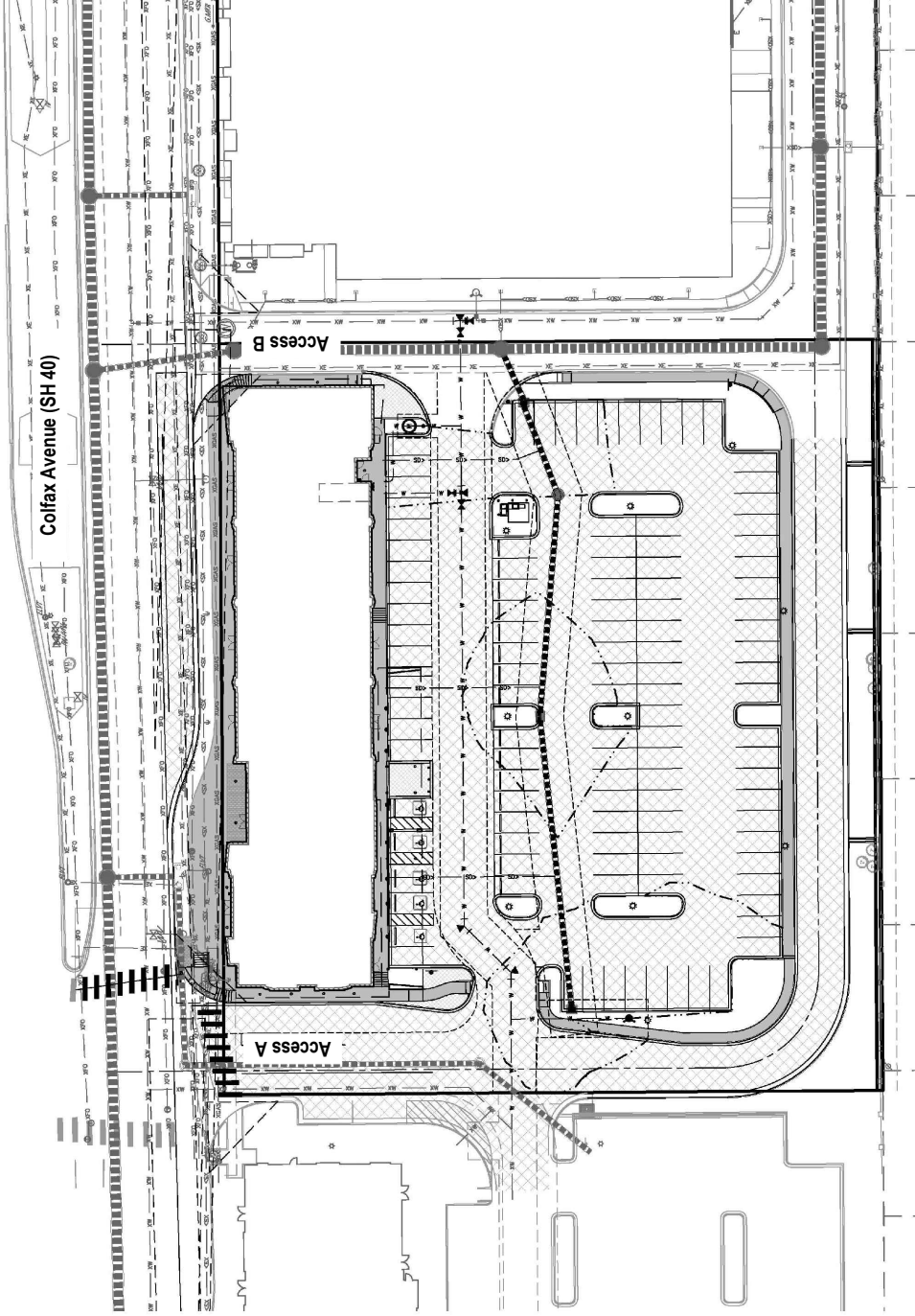
North
Not to Scale

Colfax Avenue (SH 40)

Quentin Street

Access B

Access A

Development Site

Google Earth

COLFAX & QUENTIN HOTEL
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Figure 1
SITE LOCATION

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Page 2

Not to Scale

North

Colfax Avenue (SH 40)

Access B

Access A

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Figure 2
SITE PLAN

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Existing and Committed Surface Transportation Network

Within the study area, Colfax Avenue is the primary roadway that will accommodate traffic to and from the proposed development. The secondary roadway includes Quentin Street. A brief description of both roadways is provided below:

> Colfax Avenue is an east-west state roadway having six through lanes (three lanes in each direction) with a combination of shared and exclusive turn lanes at the intersection within the study area. The Colorado Department of Transportation (CDOT) categorizes the adjacent segment of Colfax Avenue (State Highway 40) as a Non-Rural Arterial (NR-C) and provides a posted speed limit of 35 MPH.

> Quentin Street is a north-south collector roadway having two through lanes (one lane in each direction) with a combination of shared and exclusive turn lanes at the intersection within the study area. Quentin Street provides a posted speed limit of 25 MPH.

The study intersection of Colfax Avenue with Quentin Street is signalized. All other study intersections operate under a stop-controlled condition. A stop-controlled intersection is defined as a roadway intersection where vehicle rights-of-way are controlled by one or more "STOP" signs.

No regional improvements for the above described roadways are known to be planned or committed at this time. The study area roadways appear to be built to their ultimate cross-sections. Exceptions would include improvements associated with planned adjacent developments.

II. Existing Traffic Conditions

Morning (AM) and afternoon (PM) peak hour traffic counts were collected at the Colfax Avenue intersection with Quentin Street. Average daily (24-hour) traffic volumes were collected on Colfax Avenue. Counts were collected on August 15, 2019, with AM peak hour counts being collected during the period of 7:00 AM to 9:00 AM, and PM peak hour counts being collected during the period of 4:00 PM to 6:00 PM. These counts are shown on Figure 3.

It is noted that a significant number of U-turn vehicles are present at the intersection of Colfax Avenue and Quentin Street. These are shown separately in Figure 3; however, it is understood that these U-turns utilize the existing westbound left-turn lane.

Traffic count data is included for reference in Appendix A.

Existing signal timing parameters for Colfax Avenue and Quentin Street were obtained from the City of Aurora and used throughout this study to the best extent possible in order to remain consistent with existing signal coordination plans. City signal timing information received is included for reference in Appendix A.
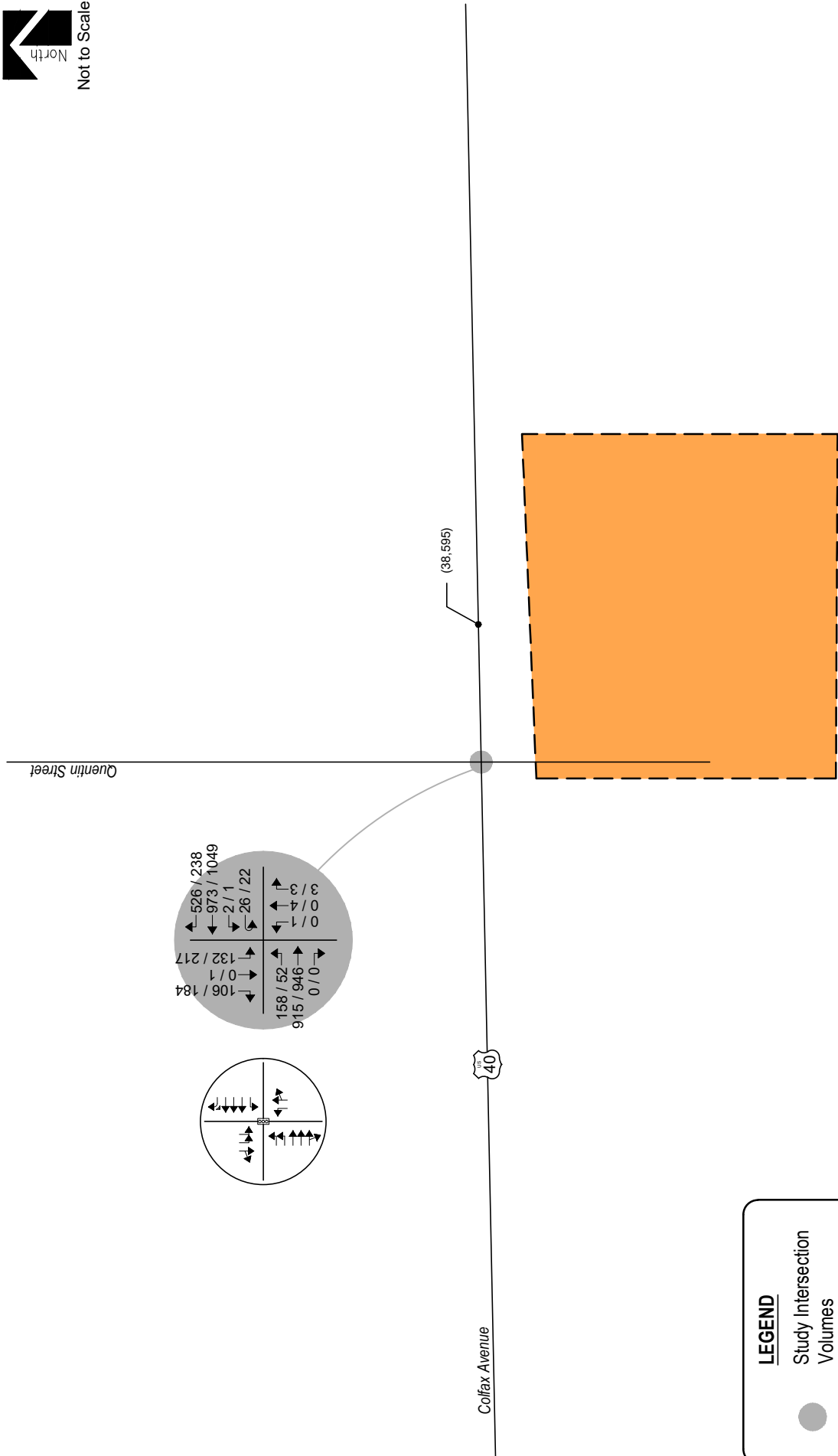
North

Not to Scale

Quentin Street

(38,595)

526 / 238
973 / 1049
2 / 1
26 / 22

3 / 3
0 / 4
0 / 1

132 / 217
0 / 1
0 / 0

106 / 184
158 / 52
915 / 946

US 40

Colfax Avenue

LEGEND

Study Intersection
Volumes

Study Intersection
Lane Geometry

Development Site

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Figure 3
EXISTING TRAFFIC
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

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The Signalized and Unsignalized Intersection Analysis techniques, as published in the Highway Capacity Manual (HCM) by the Transportation Research Board and as incorporated into the SYNCHRO computer program, were used to analyze the study intersections for existing traffic conditions. These nationally accepted techniques allow for the determination of intersection level of service (LOS) based on the congestion and delay of each traffic movement.

Level of service is a method of measurement used by transportation professionals to quantify a driver's perception of travel conditions that include travel time, number of stops, and total amount of stopped delay experienced on a roadway network. The HCM categorizes level of service into a range from "A" which indicates little, if any, vehicle delay, to "F" which indicates a level of operation considered unacceptable to most drivers. These levels of service grades with brief descriptions of the operating condition, for unsignalized and signalized intersections, are included for reference in Appendix B and have been used throughout this study.

The level of service analyses results for existing conditions are summarized in Table 1.

Intersection capacity worksheets developed for this study are provided in Appendix C.

Table 1 – Intersection Capacity Analysis Summary – Existing Traffic

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Colfax Avenue / Quentin Street (Signalized)	A (8.0)	B (13.7)

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)

Existing Traffic Analysis Results

Under existing conditions, operational analysis shows that the signalized intersection of Colfax Avenue with Quentin Street has overall operations at LOS A during the morning peak traffic hour and LOS B during the afternoon peak traffic hour.

III. Future Traffic Conditions Without Proposed Development

Background traffic is the traffic projected to be on area roadways without consideration of the proposed development. Background traffic includes traffic generated by development of vacant parcels in the area.

To account for projected increases in background traffic for Years 2021 and 2040, a compounded annual growth rate was determined using traffic data provided by CDOT's Online Transportation Information System (OTIS), which anticipates a 20-year growth rate less than one percent. Therefore, in order to provide for a conservative analysis, a growth rate of approximately two percent was applied to existing traffic volumes. This annual growth rate is also consistent with regional growth projections and the level of in-fill development expected within the area.

To account for projected traffic from adjacent developments not yet built, trip generations from the approved Fitzsimons Gateway Hotel[1] and The Plaza Fitzsimons[2] traffic studies were added to Year 2021 and Year 2040 background traffic volumes.

Pursuant to the non-committed area roadway improvements discussed in Section I, Year 2021 and Year 2040 background traffic conditions generally assume no roadway improvements to accommodate regional transportation demands. Exceptions would include the addition of an eastbound right-turn lane at the intersection of Colfax Avenue and Quentin Street as part of the adjacent planned development. Year 2040 assumes existing signal timing parameters for Colfax Avenue and Quentin Street with optimized intersection splits in effort to better long-term intersection performance. This assumption provides for a conservative analysis.

Projected background traffic volumes and intersection geometry for Years 2021 and 2040 are shown on Figure 4 and Figure 5, respectively.

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[1] Traffic Impact Study: Fitzsimons Gateway Hotel, CivTrans Engineering Inc., March 2019.
[2] The Plaza Fitzsimons: Traffic Impact Study, Matrix Design Group, June 2019.

North
Not to Scale

Quentin Street

Colfax Avenue

(42,555)

US 40

547 / 248
1012 / 1091
70 / 84
27 / 23

28 / 31
18 / 20
84 / 63

140 / 228
21 / 24
110 / 191

167 / 58
1014 / 1041
32 / 30

LEGEND

● Study Intersection Volumes

○ Study Intersection Lane Geometry

▨ Development Site

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Traffic Impact Study

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Figure 4
BACKGROUND TRAFFIC - YEAR 2021
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

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Not to Scale

North

Quentin Street

Colfax Avenue

(61,080)

US 40

800 / 362
1479 / 1595
71 / 85
40 / 33

204 / 332
21 / 25
161 / 280

30 / 33
18 / 22
84 / 64

243 / 83
1453 / 1495
32 / 30

LEGEND

Study Intersection
Volumes

Study Intersection
Lane Geometry

Development Site

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Figure 5
BACKGROUND TRAFFIC - YEAR 2040
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

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As with existing traffic conditions, the operation of study intersections was analyzed under background conditions, without the proposed development, using the SYNCHRO computer program.

Background traffic level of service analyses results for Year 2021 are listed in Table 2. Year 2040 operational results are summarized in Table 3.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

Table 2 – Intersection Capacity Analysis Summary – Background Traffic – Year 2021

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Colfax Avenue / Quentin Street (Signalized)	B (11.4)	B (15.5)

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)

Background Traffic Analysis Results – Year 2021

Year 2021 background traffic analysis indicates that the signalized intersection of Colfax Avenue with Quentin Street has overall operations at LOS B during both the AM and PM peak traffic hours.

Table 3 – Intersection Capacity Analysis Summary – Background Traffic – Year 2040

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Colfax Avenue / Quentin Street (Signalized)	B (15.3)	C (23.2)

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)

Background Traffic Analysis Results – Year 2040

By Year 2040 and without the proposed development, the study intersection of Colfax Avenue with Quentin Street experiences LOS B operations during the AM peak traffic hour and LOS C operations during the PM peak traffic hour.

IV. Proposed Project Traffic

Trip Generation

Standard traffic generation characteristics compiled by the Institute of Transportation Engineers (ITE) in their report entitled Trip Generation, 10th Edition, were applied to the proposed land use in order to estimate average daily traffic (ADT), AM Peak Hour, and PM Peak Hour vehicle trips. A vehicle trip is defined as a one-way vehicle movement from a point of origin to a point of destination.

The ITE land use code 310 (Hotel), 710 (General Office), 820 (Shopping Center), 932 (High Turnover Sit-Down Restaurant) were used for estimating trip generation because of their best fit to the proposed land use descriptions.

Trip generation rates used in this study are presented in Table 4.

Table 4 – Trip Generation Rates

ITE CODE	LAND USE	UNIT	TRIP GENERATION RATES						
			24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
				ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
310	Hotel	RMS	8.17	0.31	0.22	0.53	0.31	0.29	0.60
710	General Office	KSF	9.74	1.00	0.16	1.16	0.18	0.97	1.15
820	Shopping Center	KSF	37.75	0.58	0.36	0.94	1.83	1.98	3.81
932	Sit-Down Restaurant	KSF	112.18	5.47	4.47	9.94	6.06	3.71	9.77

Key: KSF = Thousand Square Feet Gross Floor Area. RMS = Number of Rooms.
Note: All data and calculations above are subject to being rounded to nearest value.

Table 5 illustrates projected average daily traffic (ADT), AM Peak Hour, and PM Peak Hour traffic volumes likely generated by the proposed development upon build-out.

Table 5 – Trip Generation Summary

ITE CODE	LAND USE	SIZE		TOTAL TRIPS GENERATED						
				24 HOUR	AM PEAK HOUR			PM PEAK HOUR		
					ENTER	EXIT	TOTAL	ENTER	EXIT	TOTAL
310	Hotel	100	RMS	817	31	22	53	31	29	60
710	General Office	16.7	KSF	162	17	3	19	3	16	19
820	Shopping Center	15.0	KSF	566	9	5	14	27	30	57
932	Sit-Down Restaurant	4.5	KSF	505	25	20	45	27	17	44
		Total:		2,050	81	50	131	88	92	180

Note: All data and calculations above are subject to being rounded to nearest value.

Upon build-out, Table 5 illustrates that the proposed development has the potential to generate approximately 2,050 daily trips with 131 of those occurring during the morning peak hour and 180 during the afternoon peak hour.

Adjustments to Trip Generation Rates

A development of this type is not likely to attract trips from within area land uses nor pass-by or diverted link trips from the adjacent roadway system, therefore no trip reduction was taken in this analysis.

Trip Distribution

The overall directional distribution of site-generated traffic was determined based on the location of development site within the City, proposed and existing area land uses, allowed turning movements, and available roadway network.

Overall trip distribution patterns for the development are shown on Figure 6.

Trip Assignment

Traffic assignment is how generated and distributed vehicle trips are expected to be loaded onto the available roadway network.

Applying trip distribution patterns to site-generated traffic provides the overall site-generated trip assignments shown on Figure 6.

North
Not to Scale

50%

41 / 44
15 / 28
10 / 18
16 / 18

Quentin Street
(10%)

Access B

Access A

41 / 44
10 / 18
5 / 9
20 / 37
8 / 8
16 / 18
16 / 18

US 40

Colfax Avenue
(40%)

LEGEND

Study Intersection
Volumes

Development Site

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Figure 6
SITE DEVELOPMENT DISTRIBUTION
(%) : Overall
SITE-GENERATED
AM / PM Peak Hour

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V. Future Traffic Conditions With Proposed Developments

Site-generated traffic was added to background traffic projections for Years 2021 and 2040 to develop total traffic projections. For analysis purposes, it was assumed that development construction would be completed by end of Year 2021.

Pursuant to area roadway improvement discussions provided in Section III, Year 2021 and Year 2040 total traffic conditions assume no roadway improvements to accommodate regional transportation demands. Roadway improvements associated with site development are expected to be limited to site access and frontage as required by the governing agency.

Projected Year 2021 total traffic volumes and intersection geometry are shown in Figure 7.

Figure 8 shows projected total traffic volumes and intersection geometry for Year 2040.

North

Not to Scale

Quentin Street

Colfax Avenue

(43,480)

US 40

1697 / 1490
23 / 33
1175 / 1305
33 / 32

547 / 248
1012 / 1091
111 / 128
27 / 23
38 / 49
23 / 29
104 / 100
140 / 228
29 / 32
48 / 48
110 / 191
167 / 58
1030 / 1059

Access A

Access B

LEGEND

⬤ Study Intersection Volumes

◯ Study Intersection Lane Geometry

▨ Development Site

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Figure 7
TOTAL TRAFFIC - YEAR 2021
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

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Not to Scale

North

Colfax Avenue

Quentin Street

US 40

(62,005)

2431 / 2119
23 / 33
1680 / 1865
33 / 32

Access B

Access A

800 / 362
1479 / 1595
112 / 129
40 / 33
40 / 51
23 / 31
104 / 101
204 / 332
29 / 33
48 / 48
243 / 83
1469 / 1513
161 / 280

Figure 8
TOTAL TRAFFIC - YEAR 2040
Volumes & Intersection Geometry
AM / PM Peak Hour
(ADT) : Average Daily Traffic

COLFAX & QUENTIN HOTEL
Traffic Impact Study

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VI. Project Impacts

The analyses and procedures described in this study were performed in accordance with the Highway Capacity Manual (HCM) and are based upon the worst-case conditions that occur during a typical weekday upon build-out of site development and analyzed land uses. Therefore, study intersections are likely to operate with traffic conditions better than those described within this study, which represent the peak hours of weekday operations only.

Peak Hour Intersection Levels of Service

As with background traffic, the operations of the study intersections were analyzed under projected total traffic conditions using the SYNCHRO computer program. Total traffic level of service analysis results for Years 2021 and 2040 are summarized in Table 6 and Table 7, respectively.

Definitions of levels of service are given in Appendix B. Intersection capacity worksheets are provided in Appendix C.

Table 6 – Intersection Capacity Analysis Summary – Total Traffic – Year 2021

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Colfax Avenue / Quentin Street / Access A (Signalized)	B (13.6)	B (16.7)
Colfax Avenue / Access B (Stop-Controlled) Northbound Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
         Stop-Controlled Intersection: Level of Service

Table 7 – Intersection Capacity Analysis Summary – Total Traffic – Year 2040

INTERSECTION	LEVEL OF SERVICE	
LANE GROUPS	AM PEAK HOUR	PM PEAK HOUR
Colfax Avenue / Quentin Street / Access A (Signalized)	B (18.4)	C (26.3)
Colfax Avenue / Access B (Stop-Controlled) Northbound Right	A	A

Key: Signalized Intersection: Level of Service (Control Delay in sec/veh)
Stop-Controlled Intersection: Level of Service

Total Traffic Analysis Results Upon Development Build-Out

Table 7 illustrates how, by Year 2040 and upon development build-out, the signalized intersection of Colfax Avenue with Quentin Street and Access A shows an overall LOS B operation during the morning peak traffic hour and LOS C operation during the afternoon peak traffic hour. Compared to the background traffic analysis, the traffic generated by the proposed development is not expected to significantly change the operations of the study intersection.

The stop-controlled intersection of Colfax Avenue with Access B is projected to have turning movement operations at LOS A for both the morning and afternoon peak traffic hours.

These intersection operations are similar to background conditions.

Queue Length Analysis

Queue lengths for proposed site access intersections with Colfax Avenue were analyzed using Year 2039 total traffic conditions. The analysis yields estimate of 95th percentile queue lengths, which have only a five percent probability of being exceeded during the analysis time period. Queue lengths were modeled and are included with the Synchro worksheets in Appendix C.

No significant queue at proposed Site Access B was indicated. The greatest on-site queue lengths anticipated occur at the intersection of Colfax Avenue with Quentin Street during the morning peak hour. The queue length is approximately six vehicles for the northbound left turn movement.

Auxiliary Lane Analysis

Auxiliary lanes for site development accesses are to be based on the CDOT State Highway Access Code (SHAC).

Considering development build-out, an evaluation of auxiliary lane requirements, pursuant to CDOT SHAC, reveals that a right turn deceleration lane at site accesses along Colfax Avenue is not required since the development's projected peak hour right turn ingress volume is less than CDOT's threshold of 50 vehicles per hour. Furthermore, it is noted that Colfax Avenue provides three through lanes of which the southern-most lane may serve as a right-turn lane without negatively impacting through traffic.

It is understood through conversation with CDOT Staff that the adjacent section of Colfax Avenue is envisioned to be widened to an eight-lane section (four lanes in each direction) dependent on planned developments along Colfax Avenue. Of the future four lanes provided, the outer most lane is to serve as a shared through/right turn lane. As previously noted, the adjacent development to the west of this proposed hotel development is anticipated to provide an additional eastbound right turn lane at the intersection of Colfax Avenue with Quentin Street. However, given site constraints it was determined that a continuation of the eastbound right turn lane through the intersection may not be feasible. As such a shared through/right turn lane is proposed to resume after the intersection of Colfax Avenue with Quentin Street by installing a new right turn lane into Access B. As noted above, a right-turn lane into Access B is not required pursuant to anticipated turning volumes. Any additional right-turn deceleration lane is only expected to improve upon the already acceptable intersection operations. Therefore, it is not specifically included in or analyzed by the analysis performed. It is however noted that Figure 2 does present a proposed right-turn deceleration lane as likely. Continued design of the proposed turn lane is to be coordinated between CDOT and site development personnel.

VII. Conclusion

This traffic impact study addressed the capacity, geometric, and control requirements associated with the development entitled Colfax & Quentin Hotel. This proposed commercial development consists of hotel building with ancillary uses including general office, retail, and restaurant spaces. The development is located at the southeast corner of the intersection of Colfax Avenue (SH 40) and Quentin Street in Aurora, Colorado.

The study area examined in this analysis encompassed the Colfax Avenue intersection with Quentin Street, and proposed site accesses.

Analysis was conducted for critical AM Peak Hour and PM Peak Hour traffic operations for existing traffic conditions, Year 2021 and Year 2040 background traffic conditions, and Year 2021 and Year 2040 total traffic conditions.

Under existing conditions, operational analysis shows that the signalized intersection of Colfax Avenue with Quentin Street has overall operations at LOS A during the morning peak traffic hour and LOS B during the afternoon peak traffic hour.

Year 2021 background traffic analysis indicates that the signalized intersection of Colfax Avenue with Quentin Street has overall operations at LOS B during both the AM and PM peak traffic hours.

By Year 2040 and without the proposed development, the study intersection of Colfax Avenue with Quentin Street experiences LOS B operations during the AM peak traffic hour and LOS C operations during the PM peak traffic hour.

Analysis of future traffic conditions indicates that the addition of site-generated traffic is expected to create no negative impact to traffic operations for the existing and surrounding roadway system upon implementation of the roadway and intersection control improvements assumed within this analysis. With all conservative assumptions defined in this analysis, the study intersections are projected to operate at future levels of service comparable to Year 2040 background traffic conditions. Proposed site accesses have long-term operations at LOS C or better during peak traffic periods and upon build-out.

The submittal of a new CDOT access permit is anticipated with the development of this site and will be coordinated through CDOT staff.

APPENDIX A

**Traffic Count Data
Signal Timing Information**

Location: 1 QUENTIN ST & E COLFAX AVE AM

Date: Thursday, August 15, 2019

Peak Hour: 07:00 AM - 08:00 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

Peak Hour - All Vehicles

(385) 238 0.83 683 (1,099)
QUENTIN ST

E COLFAX AVE
106 0 132 0

(2,003) 1 526 (2,707)
1,080 157 973 1,527
0.93 N 0.97
915 W 0.97 E 2
1,073 S 26 1,076
0 3

(2,090) (2,082)
0 0 0 3 E COLFAX AVE

QUENTIN ST

(5) 2 0.50 3 (7)

Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk

Traffic Counts

Interval Start Time	E COLFAX AVE Eastbound				E COLFAX AVE Westbound				QUENTIN ST Northbound				QUENTIN ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	36	236	0	5	0	234	129	0	0	0	0	0	47	0	25	712	2,841	2	6	1	0
7:15 AM	0	39	213	0	5	0	248	125	0	0	0	2	0	20	0	26	678	2,729	1	2	3	0
7:30 AM	0	39	222	0	10	1	251	127	0	0	0	0	0	39	0	30	719	2,646	6	1	1	1
7:45 AM	1	43	244	0	6	1	240	145	0	0	0	1	0	26	0	25	732	2,485	1	5	6	0
8:00 AM	0	32	225	1	7	0	185	99	0	0	0	1	0	22	0	28	600	2,348	2	0	1	0
8:15 AM	0	33	205	0	11	0	227	77	0	0	0	1	0	23	0	18	595		1	2	5	0
8:30 AM	0	24	239	0	4	0	211	52	0	0	0	0	0	15	0	13	558		1	0	1	0
8:45 AM	0	29	229	0	4	2	231	70	0	0	0	2	0	18	0	10	595		4	2	2	1
Count Total	1	275	1,813	1	52	4	1,827	824	0	0	0	7	0	210	0	175	5,189		18	18	20	2
Peak Hour	1	157	915	0	26	2	973	526	0	0	0	3	0	132	0	106	2,841		10	14	11	1

All Traffic Data
Services Inc.

(303) 216-2439
www.alltrafficdata.net

Location: 1 QUENTIN ST & E COLFAX AVE PM
Date: Thursday, August 15, 2019
Peak Hour: 05:00 PM - 06:00 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour - All Vehicles

Note: Total study counts contained in parentheses.

Peak Hour - Pedestrians/Bicycles on Crosswalk

Traffic Counts

Interval Start Time	E COLFAX AVE Eastbound				E COLFAX AVE Westbound				QUENTIN ST Northbound				QUENTIN ST Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	1	13	203	0	7	0	258	63	0	0	0	0	0	70	1	42	658	2,596	5	0	1	3
4:15 PM	1	25	210	0	7	0	246	56	0	1	0	0	0	48	0	58	652	2,645	2	0	2	3
4:30 PM	0	13	201	0	6	1	240	65	0	0	0	1	0	62	0	48	637	2,683	4	1	3	2
4:45 PM	1	15	190	1	1	0	248	84	0	0	0	1	0	52	1	55	649	2,710	2	0	0	1
5:00 PM	1	16	229	0	7	1	265	73	0	0	0	0	0	65	1	49	707	2,718	3	0	0	1
5:15 PM	1	13	244	0	5	0	240	75	0	1	4	2	0	50	0	55	690		4	0	1	1
5:30 PM	0	16	246	0	5	0	257	37	0	0	0	1	0	54	0	48	664		10	0	2	3
5:45 PM	0	5	227	0	5	0	287	53	0	0	0	0	0	48	0	32	657		2	0	1	2
Count Total	5	116	1,750	1	43	2	2,041	506	0	2	4	5	0	449	3	387	5,314		32	1	10	16
Peak Hour	2	50	946	0	22	1	1,049	238	0	1	4	3	0	217	1	184	2,718		19	0	4	7

All Traffic Data Sevices
www.alltrafficdata.net

Start Time	15-Aug-19 Thu	EB	WB	Total
12:00 AM		221	182	403
01:00		147	136	283
02:00		118	94	212
03:00		99	137	236
04:00		183	210	393
05:00		479	664	1143
06:00		852	1388	2240
07:00		**1080**	**1491**	**2571**
08:00		1009	1194	2203
09:00		921	1188	2109
10:00		922	1129	2051
11:00		886	1237	2123
12:00 PM		1053	1186	2239
01:00		1029	1122	2151
02:00		966	1282	2248
03:00		1043	**1366**	2409
04:00		1055	1288	2343
05:00		**1206**	1275	**2481**
06:00		1108	1145	2253
07:00		1078	869	1947
08:00		941	675	1616
09:00		693	510	1203
10:00		495	452	947
11:00		439	352	791
Total		18023	20572	38595
Percent		46.7%	53.3%	
AM Peak	-	07:00	07:00	07:00
Vol.	-	1080	1491	2571
PM Peak	-	17:00	15:00	17:00
Vol.	-	1206	1366	2481
Grand Total		18023	20572	38595
Percent		46.7%	53.3%	
ADT		ADT 38,595	AADT 38,595	

COLFAX AVE - QUENTIN ST PHASING DIAGRAM
INTERSECTION #364

Quentin St

Colfax Ave

ø2
ø5 4 SEC
FYA

ø2 PED

ø6 PED

ø4
PED

COMMUNICATION AND SIGNAL CABINETS
NO UPS CABINET

ø4

ø4

ø8

ø8

4 SEC
FYA ø1
ø6

ø8
PED

EB & WB ARE
COORDINATED PHASES
2 & 6

N

SEPAC ECOM All Data

Intersection Name: **ColfaxQuentinFYA10.10.2.41**   Intersection Alias: **364**

Access Data

1 : **1200 Baud**	
3 : **19200 Baud**	

Access Code: **9999**   Channel: Address: **1**

Revision: **3.33e**

IP Address: **10.10.2.41**

Phase Initialization Data

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Initial	1-Inact	3-Yel	0-None	1-Inact	1-Inact	3-Yel	0-None	1-Inact	0-None	0-None	0-None	0-None	0-None	0-None	0-None	0-None

PHASE DATA

Vehical Basic Timings / Misc Timings / Pedestrian Timings

Phase	Min Green	Passage	Max1	Max2	Yellow	All Red	Green Delay	Yellow Delay	Walk Offset Time	Walk Offset Mode	Bike Green	Bike Psg	Walk	Ped Clr	Alt Walk	Alt Ped Clr	Flash Walk	Ext Ped Clr	Actuated Rest in Walk
1	4	1.5	15	0	3.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
2	5	3.0	35	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	5	15	0	0	No	0	No
3	0	0.0	0	0	4.0	1.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
4	4	2.0	25	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	5	28	0	0	No	0	No
5	4	1.5	15	0	3.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
6	5	3.0	35	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	5	13	0	0	No	0	No
7	0	0.0	0	0	4.0	1.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
8	4	2.0	25	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	5	31	0	0	No	0	No
9	6	0.5	15	0	3.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
10	10	0.0	35	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
11	10	0.5	15	0	3.0	1.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
12	10	0.0	35	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
13	6	0.5	15	0	3.0	1.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
14	10	0.0	35	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
15	0	0.0	0	0	3.0	0.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No
16	10	0.0	35	0	4.0	2.0	0.0	0.0	0	0-Advance	0.0	0.0	0	0	0	0	No	0	No

Vehicle Density Timings / General Control / Miscellaneous / Special Sequence

Ph.	Added Initial	Max Initial	Time B4 Redu	Car B4 Redu	Time To Redu	Min Gap	Non-Act Response	Veh Recall	Ped Recall	Recall Delay	Non Lock	Dual Entry	Last Car Pass	Condit Service	No Simu Gap Out	Omit	Minus Yel	Omit Call
1	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
2	0.0	0	0	0	0	0.0	NonActI	Max	None	0	Yes	Yes	No	No	No	0	0	0
3	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
4	0.0	0	0	0	0	0.0	NonActII	None	None	0	Yes	Yes	No	No	No	0	0	0
5	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
6	0.0	0	0	0	0	0.0	NonActI	Max	None	0	Yes	Yes	No	No	No	0	0	0
7	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
8	0.0	0	0	0	0	0.0	NonActII	None	None	0	Yes	Yes	No	No	No	0	0	0
9	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
10	0.0	0	0	0	0	0.0	NonActI	Max	None	0	Yes	Yes	No	No	No	0	0	0
11	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
12	0.0	0	0	0	0	0.0	NonActI	Max	None	0	Yes	Yes	No	No	No	0	0	0
13	0.0	0	0	0	0	0.0	None	None	None	0	Yes	No	No	No	No	0	0	0
14	0.0	0	0	0	0	0.0	NonActI	Max	None	0	Yes	Yes	No	No	No	0	0	0

| 15 | 0.0 | 0 | 0 | 0 | 0 | 0.0 | None | None | None | 0 | Yes | No | No | No | No | 0 | 0 | 0 |
| 16 | 0.0 | 0 | 0 | 0 | 0 | 0.0 | NonActI | Max | None | 0 | Yes | Yes | No | No | No | 0 | 0 | 0 |

Vehical Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay
Veh Det:1	1	Veh	0	0.0	0
Veh Det:3	5	Veh	0	0.0	0
Veh Det:5	4	Veh	0	0.0	4
Veh Det:13	8	Veh	0	0.0	2
Veh Det:14	8	Veh	0	0.0	8

Pedestrian Detector

	Assign Phase	Mode	Switch Phase	Extend	Delay
Ped Det:1	2	Ped	0	0.0	0
Ped Det:2	4	Ped	0	0.0	0
Ped Det:3	6	Ped	0	0.0	0
Ped Det:4	8	Ped	0	0.0	0

Special Detector Phase Assignment

	Assign Phase	Mode	Switch Phase	Extend	Delay

:

Default Data

Unit Data

General Control

Startup Time:	6 sec
Startup State:	All Red
Red Revert:	4.0 sec
Auto Ped Clr:	No
Stop T Reset:	No
Alt Sequence:	0
Special Seq:	0-Standard

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

I/O Modes:

ABC Input(Entry) Modes: 0   **D Input(Entry) Modes:** 2

ABC Output(O/STS) Modes: 0   **D Output(O/STS) Modes:** 0

Remote Flash

Test A = Flash

Phase	Entry	Exit

Default Data
- No Flash

Default Data
- No Flash

Overlaps

Overlaps

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

Phase(s)

Start Green

Overlaps

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P

Phase(s)

Ring

Phase	Ring	Next Phase		Phase(s) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	2	Concurrent Phases	1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
2	1	3		5	5	7	7	2	2	4	4								
4	1	1		6	6	8	8	5	6	7	8								
5	2	6																	
6	2	7																	
8	2	5																	

Alternate Sequences

No Alternate
Sequences
Programmed

Port 1 Data

BIU Addr	Port Status	Basic Det	Message 40
0	Used	No	No
1	Used	No	No
8	Used	No	No
16	Used	No	No

Signal Driver Ouput

Channel	Control	Hardware Pins
1	1 - Veh Phase 1	1 - Phase 1 RYG
2	2 - Veh Phase 2	2 - Phase 2 RYG
3	3 - Veh Phase 3	3 - Phase 3 RYG
4	4 - Veh Phase 4	4 - Phase 4 RYG
5	5 - Veh Phase 5	5 - Phase 5 RYG
6	6 - Veh Phase 6	6 - Phase 6 RYG
7	7 - Veh Phase 7	7 - Phase 7 RYG
8	8 - Veh Phase 8	8 - Phase 8 RYG
9	18 - Ped Phase 2	10 - Phase 2 DPW
10	20 - Ped Phase 4	12 - Phase 4 DPW
11	22 - Ped Phase 6	14 - Phase 6 DPW
12	24 - Ped Phase 8	16 - Phase 8 DPW
13	33 - Overlap A	17 - Overlap A RYG
14	0 - None	18 - Overlap B RYG
15	35 - Overlap C	19 - Overlap C RYG
16	0 - None	20 - Overlap D RYG
17	0 - None	9 - Phase 1 DPW
18	0 - None	11 - Phase 3 DPW
19	0 - None	13 - Phase 5 DPW
20	0 - None	15 - Phase 7 DPW

Coordination Data

	Dial/Split	Cycle
General Coordination Data	1/1	140
	2/1	120
	2/2	120
	3/1	135

Operation Mode: 1=Auto   **Offset Mode:** 1=End Grn   **Manual Dial:** 1

Coordination Mode: 0=Permissive   **Force Mode:** 0=Plan   **Manual Split:** 1

Maximun Mode: 0=Inhibit   **Max Dwell Time:** 0   **Manual Offset:** 1

Correction Mode: 3=Short Way Plus   **Yield Period:** 0

Split Times and Phase Modes

Dial 1 / **Split** 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	24	0=Actuated	2	73	1=Coordinate	4	21	0=Actuated	5	15	0=Actuated
6	82	1=Coordinate	8	21	0=Actuated						

Dial 2 / **Split** 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	15	0=Actuated	2	62	1=Coordinate	4	20	0=Actuated	5	15	0=Actuated
6	62	1=Coordinate	8	20	0=Actuated						

Dial 2 / **Split** 2

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	21	0=Actuated	2	56	1=Coordinate	4	22	0=Actuated	5	17	0=Actuated
6	60	1=Coordinate	8	22	0=Actuated						

Dial 3 / **Split** 1

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode
1	13	0=Actuated	2	79	1=Coordinate	4	33	0=Actuated	5	13	0=Actuated
6	79	1=Coordinate	8	33	0=Actuated						

Traffic Plan Data

Plan: 1/1/1	Offset Time: 1	Alternat Sequence: 0	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
	Mode: 0=Normal	Special Function: 0	Correction Mode: 0=No		
Plan: 2/1/1	Offset Time: 105	Alternat Sequence: 0	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
	Mode: 0=Normal	Special Function: 0	Correction Mode: 0=No		
Plan: 2/2/1	Offset Time: 96	Alternat Sequence: 1	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
	Mode: 0=Normal	Special Function: 0	Correction Mode: 0=No		
Plan: 3/1/1	Offset Time: 107	Alternat Sequence: 0	Rg 2 Lag Time: 0	Rg 3 Lag Time: 0	Rg 4 Lag Time: 0
	Mode: 0=Normal	Special Function: 0	Correction Mode: 0=No		

Local TBC Data

Start of Daylight Saving   Month: 3   Week: 2   Cycle Zero Reference   Hours: 24   Min: 0

End of Daylight Saving   Month: 11   Week: 1

Source	Equate Days						
Day	1	2	3	4	5	6	7
	2	3	4	5	6	0	0	0

Traffic Data

PHASE FUNCTION

Event	Day	Time	D/S/O	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	1	8:30	2/2/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	1	20:30	4/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3	2	6:0	1/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
4	2	9:30	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5	2	15:0	3/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6	2	19:0	2/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7	2	22:0	4/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8	7	7:30	2/2/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9	7	22:0	4/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10	10	7:30	2/2/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
11	10	22:0	4/1/1		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

AUX. Events

Event	Program Day	Hour	Min.	Aux Ouputs 1	2	3	Det. Diag. D1	Det. Rpt. D2	Det. Mult100 D3	Dimming	Special Function Outputs 1	2	3	4	5	6	7	8
1	2	8	59	☐	☐	☐	☐	☐	☐	☐	X	☐	☐	☐	☐	☐	☐	☐
2	2	19	1															

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8	SF9	SF10	SF11	SF12	SF13	SF14	SF15	SF16
Special Function 7	☐	☐	☐	☐	☐	☐	X	☐	☐	☐	☐	☐	☐	☐	☐	☐
Special Function 8	☐	☐	☐	☐	☐	☐		X	☐	☐	☐	☐	☐	☐	☐	☐
SPC 1-8 as Phs Func 1-8	X	X	X	X	X	X		☐	☐	☐	☐	☐	☐	☐	☐	☐

Phase Omit	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

Ped Omit

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 9 Ped Omit				X	X		X			X		X	X	X	X	

Veh Det Coord ReSvc

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Function Phase Recall

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Phase Min Recall

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Veh Det Ped Recall

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Veh Det Bike Recall

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Vehicle Function

Veh Det Switch Omit	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Veh Det Switch Now

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Veh Det Switch Also

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16

Overlap Function

	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Overlap A Omit	X															

Dimming Data

Default Data - No Dimming Programmed

Lane Defination

Lanes	Name	Green Inbound	Yellow Inbound	Red Inbound	Green Outbound	Yellow Outbound

Default Data - Lane Defination

program_day	program_hour	program_minute	LanePhFun

Preemption Data

General Preemption Data

Flash > Preempt   Preempt 2 = Preempt 3   Preempt 4 = Preempt 5
Preempt 1 = Preempt 2   Preempt 3 = Preempt 4   Preempt 5 = Preempt 6

Preempt	NLock	Link to Pmpt	Del	Ext	Dur	Max Call	Lock-Out	De Boun ce	Gate Ext	Min G|W	Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Dwell Green	Ped Clear	Yel	Red	Sel Ret Mode
1	N	0	0	0	5	135	0	0.0	0	0	0	0.0	0.0	0	0	0.0	0.0	5	0	0.0	0.0	F Aut
2	N	0	0	0	5	135	0	0.0	0	0	0	0.0	0.0	0	0	0.0	0.0	5	0	0.0	0.0	F Aut
3	N	0	0	0	0	0	0	0.0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut
4	N	0	0	0	0	0	0	0.0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut
5	N	0	0	0	0	0	0	0.0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut
6	N	0	0	0	0	0	0	0.0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0	F Aut

(Select: Ped Clear, Yel, Red | Track: Grn, Ped, Yel, Red | Return: Ped Clear, Yel, Red)

Preempt 1 Phase	Exit Phase	Exit Calls	Preempt 2 Phase	Exit Phase	Exit Calls	Preempt 3 Phase	Exit Phase	Exit Calls	Preempt 4 Phase	Exit Phase	Exit Calls	Preempt 5 Phase	Exit Phase	Exit Calls	Preempt 6 Phase	Exit Phase	Exit Calls
2	Yes	No	2	Yes	No	1	No	Yes	1	No	Yes	1	No	Yes	1	No	Yes
6	Yes	No	6	Yes	No	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes	2	Yes	Yes
						3	No	Yes	3	No	Yes	3	No	Yes	3	No	Yes
						4	No	Yes	4	No	Yes	4	No	Yes	4	No	Yes
						5	No	Yes	5	No	Yes	5	No	Yes	5	No	Yes
						6	Yes	Yes	6	Yes	Yes	6	Yes	Yes	6	Yes	Yes
						7	No	Yes	7	No	Yes	7	No	Yes	7	No	Yes
						8	No	Yes	8	No	Yes	8	No	Yes	8	No	Yes

Priority Timers

Priority	Non-Locking	Delay	Ext end	Free Dial	Free Split	Min Green	No Lock out	Lock out A	Lock out B	Max Green	Pre-Green	Recall	Excl-co Phase Svc.	Signal Type	Blankout

(Transit Overlap: Signal Type, Blankout)

Priority Detector Channels

Priority

Detector

Priority Fixed Phases
Priority

Priority

Priority Bank :   Level

Partial Priority	Full Priority	Recovery
Alt Seq	Freq. Override	Method
Alt Seq Enabled	Ped skip	Return
Min Walk	Force full Priority	PedWait
	Frequency	PedOverride
	Freq. Level	

Priority :	Priority :	Priority :
Priority Bank :	**Priority Bank :**	**Priority Bank :**
Queue Phase Detector Time	Queue Phase Detector Time	Queue Phase Detector Time
Default data	**Default data**	**Default data**

Priority :	Priority :	Priority :
Priority Bank :	**Priority Bank :**	**Priority Bank :**
Queue Phase Detector Time	Queue Phase Detector Time	Queue Phase Detector Time
Default data	**Default data**	**Default data**

Priority :								Priority :							
Bank								**Bank**							
Detector	PE	1A	2A	3A	4A	5A	6A B	Detector	PE	1A	2A	3A	4A	5A	6A B
Default Data								**Default Data**							

Priority :									Priority :								
Bank									**Bank**								
Detector	PE	1A	2A	3A	4A	5A	6A	B	Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data									**Default Data**								

Priority :									Priority :								
Bank									**Bank**								
Detector	PE	1A	2A	3A	4A	5A	6A	B	Detector	PE	1A	2A	3A	4A	5A	6A	B
Default Data									**Default Data**								

Preempt 1

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph	Track	Dwell	Cycle	Ovlp	Track	Dwell	Cycle	Trail Grn
2	Green	Green	No					A	Red	Flash Grn	No	No Trail
5	Green	Green	No		**Default Data**			C	Flash Grn	Flash Grn	No	No Trail

Preempt 2

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn
1	Green	Green	No					C	Red	Flash Grn	No	No Trail
6	Green	Green	No		**Default Data**			A	Flash Grn	Flash Grn	No	No Trail

Preempt 3

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn

Default Data   **Default Data**   **Default Data**

Preempt 4

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn

Default Data   **Default Data**   **Default Data**

Preempt 5

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn

Default Data   **Default Data**   **Default Data**

Preempt 6

Vehical Phases				Pedestrian Phases				Overlaps				
Ph.	Track	Dwell	Cycle	Ph.	Track	Dwell	Cycle	Ovlp.	Track	Dwell	Cycle	Trail Grn

Default Data   **Default Data**   **Default Data**

System/Detectors Data

Local Critical Alarms

Revert to Backup: 15   1st Phone:

Local Free: No	Cycle Failure: No	Coord Failure: No	Conflict Flash: Yes	Remote Flash: Yes	2nd Phone:
Local Fash: Yes	Cycle Fault: Yes	Coord Fault: Yes	Premption: Yes	Voltage Monitor: Yes	

Special Status 1: No   Special Status 2: No   Special Status 3: No   Special Status 4: No   Special Status 5: No   Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Name	Veh/ Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Default Data

Sample Interval: 0

Queue: 1

Queue: 2

Default Data

Input Selection: 0=Average

Detector Failed Level : 0

Input Selection: 0=Average

Detector Failed Level : 0

Default Data

Queue:

Level	Enter	Leave	Dial / Split / Offset
			/ /

Default Data

System Detector	Detector Channel	Name	Veh/ Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Vehical Detector Diagnostic Value 0					Vehical Detector Diagnostic Value 1					Special Detector Diagnostic Value 0			
Detector	Max Presence	No Activity	Erratic Count		Detector	Max Presence	No Activity	Erratic Count		Detector	Max Presence	No Activity	Erratic Count
1	45	0	0							1	45	0	0
2	45	0	0		**Default Data - No Diag 1 Values**					2	45	0	0
3	45	0	0							3	45	0	0
4	45	0	0							4	45	0	0
5	45	0	0							5	45	0	0
6	45	0	0							6	45	0	0
7	45	0	0							7	45	0	0
8	45	0	0							8	45	0	0
9	45	0	0										
10	45	0	0										
11	45	0	0										
12	45	0	0										
13	45	0	0										
14	45	0	0										
15	45	0	0										
16	45	0	0										
17	45	0	0										
18	45	0	0										
19	45	0	0										
20	45	0	0										
21	45	0	0										
22	45	0	0										
23	45	0	0										
24	45	0	0										
25	45	0	0										
26	45	0	0										
27	45	0	0										
28	45	0	0										
29	45	0	0										
30	45	0	0										
31	45	0	0										
32	45	0	0										
33	45	0	0										
34	45	0	0										
35	45	0	0										
36	45	0	0										
37	45	0	0										
38	45	0	0										
39	45	0	0										
40	45	0	0										
41	45	0	0										
42	45	0	0										
43	45	0	0										
44	45	0	0										
45	45	0	0										
46	45	0	0										
47	45	0	0										
48	45	0	0										
49	45	0	0										
50	45	0	0										
51	45	0	0										
52	45	0	0										
53	45	0	0										
54	45	0	0										

55	45	0	0
56	45	0	0
57	45	0	0
58	45	0	0
59	45	0	0
60	45	0	0
61	45	0	0
62	45	0	0
63	45	0	0
64	45	0	0

Pedestrian Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count
1	45	0	0
2	45	0	0
3	45	0	0
4	45	0	0
5	45	0	0
6	45	0	0
7	45	0	0
8	45	0	0

Pedestrian Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Speed Trap Data

Speed Trap:

Measurement:

Detector 1   Detector_2   Distance :

Dial/Split/Offset //	Speed Trap Low Treshold	Speed Trap High Treshold

Default Data

Default Data

Volume Detector Data

Report Interval   15

Volume Detector Number	Controller Detector Channel

Default Data

APPENDIX B

Level of Service Definitions

The following information can be found in the <u>Highway Capacity Manual,</u> Transportation Research Board, 2010: Chapter 18 – Signalized Intersections and Chapter 19 – Two-Way Stop Controlled Intersections.

<u>Automobile Level of Service (LOS) for Signalized Intersections</u>

Levels of service are defined to represent reasonable ranges in control delay.

<u>LOS A</u>
Describes operations with a control delay of 10s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

<u>LOS B</u>
Describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

<u>LOS C</u>
Describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

<u>LOS D</u>
Describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

<u>LOS E</u>
Describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

<u>LOS F</u>
Describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

<u>Level of Service (LOS) for Unsignalized TWSC Intersections</u>

Level of Service	Average Control Delay (s/veh)
A	0 - 10
B	> 10 - 15
C	> 15 - 25
D	> 25 - 35
E	> 35 - 50
F	> 50

APPENDIX C

Capacity Worksheets

Timings
1: Quentin Street & Colfax Avenue (SH 40)

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↑↑↱			↱	↑↑↑	↱	↱	↱		↰↱	↱
Traffic Volume (vph)	158	915	0	26	2	973	526	0	0	3	132	0
Future Volume (vph)	158	915	0	26	2	973	526	0	0	3	132	0
Satd. Flow (prot)	3433	5085	0	0	1770	5085	1583	1863	1583	0	3433	1583
Flt Permitted	0.235				0.276						0.756	
Satd. Flow (perm)	849	5085	0	0	514	5085	1583	1863	1583	0	2732	1583
Satd. Flow (RTOR)							572		237			263
Lane Group Flow (vph)	172	995	0	0	30	1058	572	0	3	0	143	115
Turn Type	pm+pt	NA		custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6			5	2		2	4			8	
Detector Phase	1	6		5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0		9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	24.0	84.0		15.0	15.0	75.0	75.0	21.0	21.0		21.0	21.0
Total Split (%)	20.0%	70.0%		12.5%	12.5%	62.5%	62.5%	17.5%	17.5%		17.5%	17.5%
Yellow Time (s)	3.0	4.0		3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0			5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max		None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	91.6	86.3			88.1	81.2	81.2		15.0		15.0	15.0
Actuated g/C Ratio	0.76	0.72			0.73	0.68	0.68		0.12		0.12	0.12
v/c Ratio	0.22	0.27			0.07	0.31	0.46		0.01		0.42	0.27
Control Delay	3.7	6.6			3.4	8.3	1.8		0.0		52.7	1.5
Queue Delay	0.0	0.0			0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	3.7	6.6			3.4	8.3	1.8		0.0		52.7	1.5
LOS	A	A			A	A	A		A		D	A
Approach Delay		6.1				5.9						29.9
Approach LOS		A				A						C
Queue Length 50th (ft)	12	100			4	111	0		0		53	0
Queue Length 95th (ft)	20	123			10	136	35		0		87	0
Internal Link Dist (ft)		577				1548			520			465
Turn Bay Length (ft)	230				110						300	
Base Capacity (vph)	1074	3656			499	3439	1256		405		341	428
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	0.16	0.27			0.06	0.31	0.46		0.01		0.42	0.27

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 18 (15%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	106
Future Volume (vph)	106
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.46

Intersection Signal Delay: 8.0	Intersection LOS: A
Intersection Capacity Utilization 54.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
24 s	75 s		21 s

Ø5	Ø6 (R)		Ø8
15 s	84 s		21 s

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↑↑↱			↱	↑↑↑	↱	↱	↱		↰↱	↱
Traffic Volume (vph)	52	946	0	22	1	1049	238	1	4	3	217	1
Future Volume (vph)	52	946	0	22	1	1049	238	1	4	3	217	1
Satd. Flow (prot)	3433	5085	0	0	1770	5085	1583	1770	1744	0	3433	1585
Flt Permitted	0.204				0.246			0.498			0.753	
Satd. Flow (perm)	737	5085	0	0	458	5085	1583	928	1744	0	2721	1585
Satd. Flow (RTOR)							259		3			182
Lane Group Flow (vph)	57	1028	0	0	25	1140	259	1	7	0	236	201
Turn Type	pm+pt	NA		custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6			5	2		2	4			8	
Detector Phase	1	6		5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0		9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	13.0	74.0		13.0	13.0	74.0	74.0	33.0	33.0		33.0	33.0
Total Split (%)	10.8%	61.7%		10.8%	10.8%	61.7%	61.7%	27.5%	27.5%		27.5%	27.5%
Yellow Time (s)	3.0	4.0		3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0			5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max		None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	79.0	74.2			78.0	72.0	72.0	27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.66	0.62			0.65	0.60	0.60	0.22	0.22		0.22	0.22
v/c Ratio	0.09	0.33			0.07	0.37	0.25	0.00	0.02		0.39	0.40
Control Delay	6.6	11.9			6.7	13.2	2.0	36.0	29.7		41.7	10.0
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	6.6	11.9			6.7	13.2	2.0	36.0	29.7		41.7	10.0
LOS	A	B			A	B	A	D	C		D	B
Approach Delay		11.6				11.0			30.5			27.1
Approach LOS		B				B			C			C
Queue Length 50th (ft)	6	144			6	164	0	1	2		80	12
Queue Length 95th (ft)	13	176			15	198	35	6	15		120	75
Internal Link Dist (ft)		577				1548			520			465
Turn Bay Length (ft)	230				110						300	
Base Capacity (vph)	671	3143			390	3051	1053	208	394		612	497
Starvation Cap Reductn	0	0			0	0	0	0	0		0	0
Spillback Cap Reductn	0	0			0	0	0	0	0		0	0
Storage Cap Reductn	0	0			0	0	0	0	0		0	0
Reduced v/c Ratio	0.08	0.33			0.06	0.37	0.25	0.00	0.02		0.39	0.40

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 40

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	184
Future Volume (vph)	184
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 45.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
13 s	74 s		33 s

Ø5	Ø6 (R)		Ø8
13 s	74 s		33 s

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰↑	↑↑↑	↱		↱	↑↑↑	↱	↰	↱		↰↑	↱
Traffic Volume (vph)	167	1014	32	27	70	1012	547	84	18	28	140	21
Future Volume (vph)	167	1014	32	27	70	1012	547	84	18	28	140	21
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1695	0	3433	1628
Flt Permitted	0.232				0.230			0.530			0.724	
Satd. Flow (perm)	838	5085	1583	0	428	5085	1583	987	1695	0	2616	1628
Satd. Flow (RTOR)			73				595		30			120
Lane Group Flow (vph)	182	1102	35	0	105	1100	595	91	50	0	152	143
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	24.0	84.0	84.0	15.0	15.0	75.0	75.0	21.0	21.0		21.0	21.0
Total Split (%)	20.0%	70.0%	70.0%	12.5%	12.5%	62.5%	62.5%	17.5%	17.5%		17.5%	17.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	88.8	80.9	80.9		89.2	81.1	81.1	15.0	15.0		15.0	15.0
Actuated g/C Ratio	0.74	0.67	0.67		0.74	0.68	0.68	0.12	0.12		0.12	0.12
v/c Ratio	0.24	0.32	0.03		0.26	0.32	0.47	0.74	0.21		0.46	0.46
Control Delay	3.9	8.5	0.2		4.8	8.4	1.9	84.4	26.7		53.9	17.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	3.9	8.5	0.2		4.8	8.4	1.9	84.4	26.7		53.9	17.7
LOS	A	A	A		A	A	A	F	C		D	B
Approach Delay		7.6				6.0			63.9			36.3
Approach LOS		A				A			E			D
Queue Length 50th (ft)	13	118	0		16	117	0	69	14		57	16
Queue Length 95th (ft)	21	146	1		27	143	36	#157	52		92	79
Internal Link Dist (ft)		577				1548			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	1067	3428	1090		440	3436	1262	123	238		327	308
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.17	0.32	0.03		0.24	0.32	0.47	0.74	0.21		0.46	0.46

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 45
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	110
Future Volume (vph)	110
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.74

Intersection Signal Delay: 11.4	Intersection LOS: B
Intersection Capacity Utilization 56.7%	ICU Level of Service B

Analysis Period (min) 15

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

   Queue shown is maximum after two cycles.

Splits and Phases: 1: Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
24 s	75 s		21 s

Ø5	Ø6 (R)		Ø8
15 s	84 s		21 s

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↑↑↑	↱		↰	↑↑↑	↱	↰	↑		↰↱	↑
Traffic Volume (vph)	58	1041	30	23	84	1091	248	63	20	31	228	24
Future Volume (vph)	58	1041	30	23	84	1091	248	63	20	31	228	24
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1693	0	3433	1615
Flt Permitted	0.202				0.199			0.434			0.720	
Satd. Flow (perm)	730	5085	1583	0	371	5085	1583	808	1693	0	2602	1615
Satd. Flow (RTOR)			73				270		34			175
Lane Group Flow (vph)	63	1132	33	0	116	1186	270	68	56	0	248	234
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	13.0	74.0	74.0	13.0	13.0	74.0	74.0	33.0	33.0		33.0	33.0
Total Split (%)	10.8%	61.7%	61.7%	10.8%	10.8%	61.7%	61.7%	27.5%	27.5%		27.5%	27.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	75.6	68.5	68.5		79.2	71.9	71.9	27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.63	0.57	0.57		0.66	0.60	0.60	0.22	0.22		0.22	0.22
v/c Ratio	0.11	0.39	0.04		0.35	0.39	0.26	0.38	0.14		0.42	0.47
Control Delay	6.7	14.8	0.1		9.5	13.4	2.0	46.5	19.5		42.5	14.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	6.7	14.8	0.1		9.5	13.4	2.0	46.5	19.5		42.5	14.7
LOS	A	B	A		A	B	A	D	B		D	B
Approach Delay		14.0				11.2			34.3			29.0
Approach LOS		B				B			C			C
Queue Length 50th (ft)	7	170	0		28	173	0	45	13		85	37
Queue Length 95th (ft)	14	202	1		48	208	35	92	49		126	113
Internal Link Dist (ft)		577				1548			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	651	2900	934		338	3048	1057	181	407		585	499
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.10	0.39	0.04		0.34	0.39	0.26	0.38	0.14		0.42	0.47

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	191
Future Volume (vph)	191
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 15.5	Intersection LOS: B
Intersection Capacity Utilization 61.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
13 s	74 s		33 s

Ø5	Ø6 (R)		Ø8
13 s	74 s		33 s

| Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↑↑↑	↱	⤴	⤸	↑↑↑	↱	↰	↱		↰↱	↱
Traffic Volume (vph)	243	1453	32	40	71	1479	800	84	18	30	204	21
Future Volume (vph)	243	1453	32	40	71	1479	800	84	18	30	204	21
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1690	0	3433	1615
Flt Permitted	0.109				0.115			0.468			0.722	
Satd. Flow (perm)	394	5085	1583	0	214	5085	1583	872	1690	0	2609	1615
Satd. Flow (RTOR)			73				713		33			149
Lane Group Flow (vph)	264	1579	35	0	120	1608	870	91	53	0	222	198
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	14.0	76.0	76.0	15.0	15.0	77.0	77.0	29.0	29.0		29.0	29.0
Total Split (%)	11.7%	63.3%	63.3%	12.5%	12.5%	64.2%	64.2%	24.2%	24.2%		24.2%	24.2%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	81.1	72.0	72.0		80.9	71.8	71.8	23.0	23.0		23.0	23.0
Actuated g/C Ratio	0.68	0.60	0.60		0.67	0.60	0.60	0.19	0.19		0.19	0.19
v/c Ratio	0.56	0.52	0.04		0.48	0.53	0.71	0.54	0.15		0.44	0.46
Control Delay	11.2	14.8	0.3		12.4	15.0	6.2	57.4	21.1		46.1	16.2
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	11.2	14.8	0.3		12.4	15.0	6.2	57.4	21.1		46.1	16.2
LOS	B	B	A		B	B	A	E	C		D	B
Approach Delay		14.1				11.9			44.0			32.0
Approach LOS		B				B			D			C
Queue Length 50th (ft)	28	243	0		25	253	51	64	13		78	32
Queue Length 95th (ft)	42	296	2		43	297	176	123	49		119	104
Internal Link Dist (ft)		577				1548			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	497	3050	978		277	3044	1233	167	350		500	429
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.53	0.52	0.04		0.43	0.53	0.71	0.54	0.15		0.44	0.46

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 19 (16%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	161
Future Volume (vph)	161
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 15.3	Intersection LOS: B
Intersection Capacity Utilization 74.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Quentin Street & Colfax Avenue (SH 40)

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↱↱	↑↑↑	↗		↱	↑↑↑	↗	↱	↱		↱↱	↱
Traffic Volume (vph)	83	1495	30	33	85	1595	362	64	22	33	332	25
Future Volume (vph)	83	1495	30	33	85	1595	362	64	22	33	332	25
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1695	0	3433	1606
Flt Permitted	0.085				0.076			0.350			0.718	
Satd. Flow (perm)	307	5085	1583	0	142	5085	1583	652	1695	0	2595	1606
Satd. Flow (RTOR)			118				393		36			81
Lane Group Flow (vph)	90	1625	33	0	128	1734	393	70	60	0	361	331
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	9.0	61.0	61.0	18.0	18.0	70.0	70.0	41.0	41.0		41.0	41.0
Total Split (%)	7.5%	50.8%	50.8%	15.0%	15.0%	58.3%	58.3%	34.2%	34.2%		34.2%	34.2%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	63.3	58.3	58.3		73.4	64.0	64.0	35.0	35.0		35.0	35.0
Actuated g/C Ratio	0.53	0.49	0.49		0.61	0.53	0.53	0.29	0.29		0.29	0.29
v/c Ratio	0.34	0.66	0.04		0.59	0.64	0.38	0.37	0.12		0.48	0.63
Control Delay	13.6	25.3	0.1		26.3	21.2	2.5	40.7	16.1		37.5	33.6
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	13.6	25.3	0.1		26.3	21.2	2.5	40.7	16.1		37.5	33.6
LOS	B	C	A		C	C	A	D	B		D	C
Approach Delay		24.2				18.2			29.3			35.7
Approach LOS		C				B			C			D
Queue Length 50th (ft)	13	335	0		38	334	0	43	13		118	169
Queue Length 95th (ft)	23	414	0		96	385	46	90	47		166	273
Internal Link Dist (ft)		577				1548			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	266	2469	829		263	2712	1027	190	519		756	525
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.34	0.66	0.04		0.49	0.64	0.38	0.37	0.12		0.48	0.63

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 3 (3%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 55

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	280
Future Volume (vph)	280
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 76.8%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
9 s	70 s		41 s

Ø5	Ø6 (R)		Ø8
18 s	61 s		41 s

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↰↑	↑↑↑	↱		↱	↑↑↑	↱	↱	↟		↰↑	↟
Traffic Volume (vph)	167	1030	48	27	111	1012	547	104	23	38	140	29
Future Volume (vph)	167	1030	48	27	111	1012	547	104	23	38	140	29
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1690	0	3433	1643
Flt Permitted	0.234				0.222			0.498			0.714	
Satd. Flow (perm)	846	5085	1583	0	414	5085	1583	928	1690	0	2580	1643
Satd. Flow (RTOR)			73				595		41			120
Lane Group Flow (vph)	182	1120	52	0	150	1100	595	113	66	0	152	152
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	24.0	84.0	84.0	15.0	15.0	75.0	75.0	21.0	21.0		21.0	21.0
Total Split (%)	20.0%	70.0%	70.0%	12.5%	12.5%	62.5%	62.5%	17.5%	17.5%		17.5%	17.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	88.0	80.1	80.1		90.0	81.1	81.1	15.0	15.0		15.0	15.0
Actuated g/C Ratio	0.73	0.67	0.67		0.75	0.68	0.68	0.12	0.12		0.12	0.12
v/c Ratio	0.24	0.33	0.05		0.38	0.32	0.47	0.97	0.27		0.47	0.49
Control Delay	3.9	8.9	0.9		5.9	8.4	1.9	130.0	25.3		54.2	19.5
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	3.9	8.9	0.9		5.9	8.4	1.9	130.0	25.3		54.2	19.5
LOS	A	A	A		A	A	A	F	C		D	B
Approach Delay		7.9				6.1			91.4			36.8
Approach LOS		A				A			F			D
Queue Length 50th (ft)	13	123	0		23	117	0	88	18		57	22
Queue Length 95th (ft)	21	154	8		37	143	36	#210	61		92	88
Internal Link Dist (ft)		577				251			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	1072	3393	1080		430	3436	1262	116	247		322	310
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.17	0.33	0.05		0.35	0.32	0.47	0.97	0.27		0.47	0.49

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 18 (15%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	110
Future Volume (vph)	110
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 13.5   Intersection LOS: B

Intersection Capacity Utilization 60.8%   ICU Level of Service B

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Access A/Quentin Street & Colfax Avenue (SH 40)

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↿↾	↑↑↑	↗		↘	↑↑↑	↗	↘	↱		↿↾	↱
Traffic Volume (vph)	58	1059	48	23	128	1091	248	100	29	49	228	32
Future Volume (vph)	58	1059	48	23	128	1091	248	100	29	49	228	32
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1688	0	3433	1624
Flt Permitted	0.203				0.193			0.416			0.702	
Satd. Flow (perm)	734	5085	1583	0	360	5085	1583	775	1688	0	2537	1624
Satd. Flow (RTOR)			73				270		53			175
Lane Group Flow (vph)	63	1151	52	0	164	1186	270	109	85	0	248	243
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	13.0	74.0	74.0	13.0	13.0	74.0	74.0	33.0	33.0		33.0	33.0
Total Split (%)	10.8%	61.7%	61.7%	10.8%	10.8%	61.7%	61.7%	27.5%	27.5%		27.5%	27.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	75.3	68.2	68.2		79.3	71.9	71.9	27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.63	0.57	0.57		0.66	0.60	0.60	0.22	0.22		0.22	0.22
v/c Ratio	0.11	0.40	0.06		0.50	0.39	0.26	0.63	0.20		0.44	0.49
Control Delay	6.7	15.0	1.4		12.1	13.4	2.0	59.5	18.2		42.8	15.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	6.7	15.0	1.4		12.1	13.4	2.0	59.5	18.2		42.8	15.8
LOS	A	B	A		B	B	A	E	B		D	B
Approach Delay		14.0				11.4			41.4			29.4
Approach LOS		B				B			D			C
Queue Length 50th (ft)	7	174	0		40	173	0	77	20		85	43
Queue Length 95th (ft)	14	206	10		65	208	35	#154	63		126	121
Internal Link Dist (ft)		577				251			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	651	2889	930		332	3048	1057	174	420		570	501
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.10	0.40	0.06		0.49	0.39	0.26	0.63	0.20		0.44	0.49

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 16 (13%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 45

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	191
Future Volume (vph)	191
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 16.4	Intersection LOS: B
Intersection Capacity Utilization 67.0%	ICU Level of Service C

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Access A/Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
13 s	74 s		33 s
Ø5	Ø6 (R)		Ø8
13 s	74 s		33 s

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↱↱	↑↑↑	↗		↰	↑↑↑	↗	↱	↱		↱↱	↱
Traffic Volume (vph)	243	1469	48	40	112	1479	800	104	23	40	204	29
Future Volume (vph)	243	1469	48	40	112	1479	800	104	23	40	204	29
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1686	0	3433	1626
Flt Permitted	0.106				0.097			0.487			0.713	
Satd. Flow (perm)	383	5085	1583	0	181	5085	1583	907	1686	0	2577	1626
Satd. Flow (RTOR)			118				730		43			157
Lane Group Flow (vph)	264	1597	52	0	165	1608	870	113	68	0	222	207
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	14.0	67.0	67.0	20.0	20.0	73.0	73.0	33.0	33.0		33.0	33.0
Total Split (%)	11.7%	55.8%	55.8%	16.7%	16.7%	60.8%	60.8%	27.5%	27.5%		27.5%	27.5%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	74.7	65.3	65.3		79.1	67.6	67.6	27.0	27.0		27.0	27.0
Actuated g/C Ratio	0.62	0.54	0.54		0.66	0.56	0.56	0.22	0.22		0.22	0.22
v/c Ratio	0.59	0.58	0.06		0.63	0.56	0.72	0.55	0.17		0.38	0.43
Control Delay	15.4	19.6	0.1		23.5	17.7	6.7	53.0	18.3		41.8	14.1
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	15.4	19.6	0.1		23.5	17.7	6.7	53.0	18.3		41.8	14.1
LOS	B	B	A		C	B	A	D	B		D	B
Approach Delay		18.5				14.5			39.9			28.4
Approach LOS		B				B			D			C
Queue Length 50th (ft)	32	285	0		41	278	50	78	15		75	31
Queue Length 95th (ft)	58	363	0		105	325	183	143	54		113	101
Internal Link Dist (ft)		577				251			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	469	2767	915		322	2866	1211	204	412		579	487
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.56	0.58	0.06		0.51	0.56	0.72	0.55	0.17		0.38	0.43

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 10 (8%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	161
Future Volume (vph)	161
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.72

Intersection Signal Delay: 18.0	Intersection LOS: B
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Access A/Quentin Street & Colfax Avenue (SH 40)

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↟↟	↟↟↟	↗		↷	↟↟↟	↗	↰	↱		↟↟	↱
Traffic Volume (vph)	83	1513	48	33	129	1595	362	101	31	51	332	33
Future Volume (vph)	83	1513	48	33	129	1595	362	101	31	51	332	33
Satd. Flow (prot)	3433	5085	1583	0	1770	5085	1583	1770	1690	0	3433	1613
Flt Permitted	0.085				0.068			0.356			0.699	
Satd. Flow (perm)	307	5085	1583	0	127	5085	1583	663	1690	0	2526	1613
Satd. Flow (RTOR)			118				393		55			82
Lane Group Flow (vph)	90	1645	52	0	176	1734	393	110	89	0	361	340
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	Perm	NA		Perm	NA
Protected Phases	1	6			5	2			4			8
Permitted Phases	6		6	5	2		2	4			8	
Detector Phase	1	6	6	5	5	2	2	4	4		8	8
Switch Phase												
Minimum Initial (s)	4.0	5.0	5.0	4.0	4.0	5.0	5.0	4.0	4.0		4.0	4.0
Minimum Split (s)	9.0	11.0	11.0	9.0	9.0	11.0	11.0	10.0	10.0		10.0	10.0
Total Split (s)	9.0	56.0	56.0	21.0	21.0	68.0	68.0	43.0	43.0		43.0	43.0
Total Split (%)	7.5%	46.7%	46.7%	17.5%	17.5%	56.7%	56.7%	35.8%	35.8%		35.8%	35.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	3.0	4.0	4.0	4.0	4.0		4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lead	Lag	Lag					
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes					
Recall Mode	None	C-Max	C-Max	None	None	C-Max	C-Max	Max	Max		Max	Max
Act Effct Green (s)	58.8	53.8	53.8		71.8	62.0	62.0	37.0	37.0		37.0	37.0
Actuated g/C Ratio	0.49	0.45	0.45		0.60	0.52	0.52	0.31	0.31		0.31	0.31
v/c Ratio	0.35	0.72	0.07		0.73	0.66	0.39	0.54	0.16		0.46	0.61
Control Delay	15.4	29.7	0.2		41.6	22.8	2.7	46.0	14.3		35.9	32.0
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	15.4	29.7	0.2		41.6	22.8	2.7	46.0	14.3		35.9	32.0
LOS	B	C	A		D	C	A	D	B		D	C
Approach Delay		28.1				20.8			31.8			34.0
Approach LOS		C				C			C			C
Queue Length 50th (ft)	13	373	0		80	348	0	71	19		115	171
Queue Length 95th (ft)	24	457	0		155	401	48	136	58		162	273
Internal Link Dist (ft)		577				251			520			465
Turn Bay Length (ft)	230		200		110						300	
Base Capacity (vph)	254	2281	775		295	2627	1007	204	559		778	554
Starvation Cap Reductn	0	0	0		0	0	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0		0	0
Reduced v/c Ratio	0.35	0.72	0.07		0.60	0.66	0.39	0.54	0.16		0.46	0.61

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 118 (98%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow

Natural Cycle: 50

Control Type: Actuated-Coordinated

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	280
Future Volume (vph)	280
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Satd. Flow (RTOR)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 82.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 1: Access A/Quentin Street & Colfax Avenue (SH 40)

Ø1	Ø2 (R)		Ø4
9 s	68 s		43 s

Ø5	Ø6 (R)		Ø8
21 s	56 s		43 s