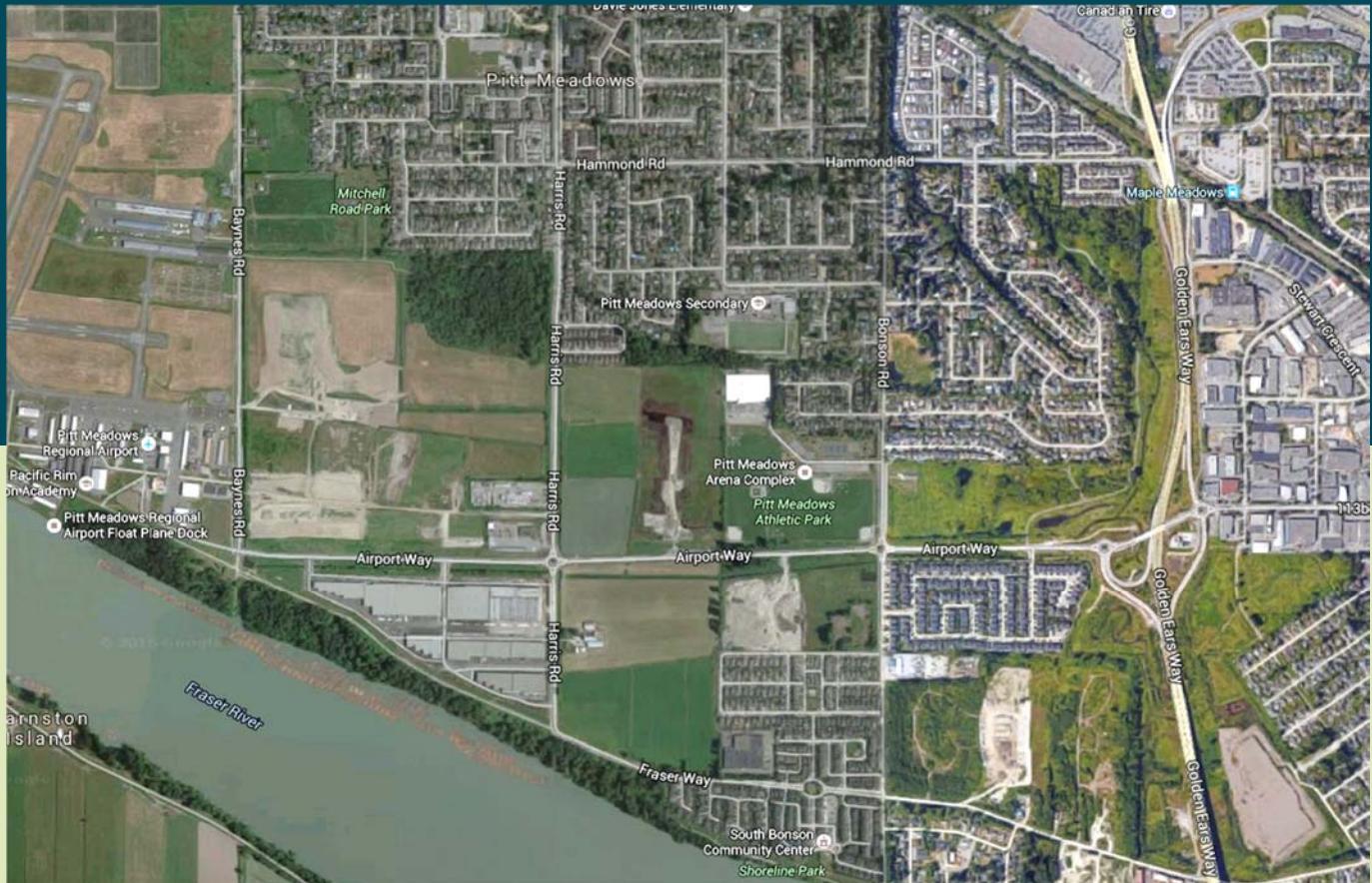




South Bonson Traffic Study

Final Report



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- D Signal Warrants
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Executive Summary

Study Purpose

The purpose of this study was to prepare a Traffic Study for the South Bonson Area to assess the impacts of future developments on road network performance, intersection control methods, and pedestrian safety / accessibility, especially the future planned development of Golden Ears Business Park (GEBP) and other residential / institutional land uses along Airport Way.

This report focussed on:

- Future development and growth for years 2021 and 2031 (full build-out);
- Traffic operations at eight (8) intersections;
- Pedestrian access throughout the neighbourhood; and
- Traffic control elements.

Developments

All currently approved developments are assumed to be completed in the short term horizon, by 2021, and complete buildup of the area as per the City of Pitt Meadows Official Community Plan (OCP) in the long term horizon, by 2031.

Traffic and Pedestrian Counts Developments

Weekday AM and PM peak period traffic and pedestrian counts at the eight study intersections were recorded between Wednesday, January 27, 2016, and Tuesday, February 2, 2016. Weekday AM peak traffic volumes were recorded from 7 AM to 9 AM; weekday PM peak volumes from 2:30 PM to 6 PM. Based on the peak period counts, the peak hour (hour of highest traffic volumes within the peak period) were used for analysis at each study intersection.

A pedestrian count at the Bonson Road / 116A /116B Avenue intersection showed a surge in pedestrian activity between 8:00 and 8:30 in the morning and between 2:30 and 3:15 in the afternoon due to school drop off / pickup at Pitt Meadows Secondary school on 116B Avenue.

Trip Generation and Distribution

The proposed developments expected to be completed by 2021 are estimated to generate an additional 1,401 weekday AM peak hour trips (1,077 inbound and 324 outbound), and 1,850 weekday PM peak hour trips (448 inbound and 1,402 outbound).

Compared to 2016 traffic conditions, the proposed developments completed by 2031 are expected to generate an additional 1,943 weekday AM peak hour trips (1,502 inbound and 441 outbound), and 2,626 weekday PM peak hour trips (620 inbound and 2,004 outbound).

The directional distribution (origin / destination) of proposed development trips is presented in **Table ES1**. This traffic distribution remains applicable for the purposes of this study as it is similar to the distribution applied in a previous Traffic Impact Assessment report by EBA Consulting for GEBP Phase 2 and also in the MMM Group's GEBP Phase 3 / 4 Transportation Impact Study, 2015.

Table ES1 Trip Distribution

Direction	Trip Distribution
East on Airport Way towards Golden Ears Way	50%
West on Airport Way towards Bayne Road	0%
North on Harris Road towards Lougheed Highway	30%
North on Bonson Road towards Hammond Road	15%
South on Harris Road towards Fraser Way	5%
Total	100%

Traffic Growth and Combined Volumes

A 2% per year traffic growth rate was applied to Existing Conditions (2016) traffic volumes to determine the 2021 and 2031 background traffic volumes at the study intersections. The calculated trips generated by the expected developments were assigned to the network and then added to the background traffic to estimate the total future combined volumes for 2021 and 2031.

Traffic Analysis

All study intersections were analyzed using Synchro and Sidra traffic simulation software to calculate the traffic performance at the study intersections.

A summary of the overall intersection performance in terms of LOS, and average delays in seconds/vehicle (s/veh) for each study intersection is shown in **Table ES2**. Individual movement LOS, delay and 95th percentile queue length (in metres) for the Existing Conditions (2016) and Future Years 2021 and 2031 scenarios are presented in the report.

Table ES2 Intersection Performance Summary

Location	Control Type ⁽¹⁾	Peak	2016		2021 Background		2031 Background		2021 Combined		2031 Combined	
			LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
Airport Way / Harris Road	RA	AM	A	1.4	A	7.2	A	8.5	F	74.4	F	159.5
		PM	A	7.2	A	7.8	A	9.3	F	133.6	F	237.7
Airport Way / Bonson Road	RA	AM	B	11.4	B	13.6	C	21.5	F	85.1	F	199.5
		PM	B	12.7	C	16.0	D	30.9	F	214.6	F	418.2
Airport Way / Southgate Road	SSSC	AM	A	0.9	A	0.9	A	1.1	A	1.0	A	1.9
		PM	A	1.0	A	1.2	A	1.5	A	2.2	A	6.7
Bonson Road / Hammond Road	Signal	AM	B	15.2	B	16.9	B	19.4	C	22.7	C	29.5
		PM	C	22.0	C	25.2	C	22.6	C	23.0	C	28.5
Bonson Road / 116A / 116B Ave	SSSC	AM	A	4.9	A	5.3	A	6.4	A	5.5	A	9.6
		PM	A	2.5	A	2.6	A	2.9	A	2.3	A	3.0
Bonson Road / Sutton Ave	SSSC	AM	A	1.1	A	1.1	A	1.1	A	2.6	A	3.4
		PM	A	0.5	A	0.5	A	0.5	A	1.1	A	1.8
Harris Road / Fieldstone Walk	SSSC	AM	A	0.2	A	0.2	A	0.2	A	0.2	A	0.2
		PM	A	0.3	A	0.3	A	0.3	A	0.3	A	0.3

Notes: 1. RA = Roundabout | SSSC = Side-street stop-controlled | **Bold** indicates unacceptable operation (LOS E or F)

Based on the intersection performance for the background and combined traffic performance, capacity issues were identified and suitable improvement options were recommended as listed below.

- Airport Way / Harris Road – Intersection Signalization
- Airport Way / Bonson Road – Intersection Signalization
- Right-in-Right-out Access at Airport Way for Sutton Ave Development - Channelized traffic island
- Airport Way / Southgate Road - Signalized pedestrian crossing (subject to meeting the pedestrian crossing control warrant)
- Harris Road / Fieldstone Walk - Signalized pedestrian crossing (subject to meeting the pedestrian crossing control warrant)

Existing Airport Way / Bonson Road Roundabout Operational and Safety Review

A site visit to the Bonson Road / Airport Road roundabout was conducted during the after school period (3 to 4 PM) to observe safety and operational performance, particularly related to sight distance, pedestrian movements and traffic conflicts. The following observations were noted:

- Numerous students were observed to cross the roundabout and no unusual conflicts were noted between pedestrians and vehicles.
- The absence of a narrow boulevard separation between the curb and concrete sidewalk may lead to conflicts between pedestrians and the overhang portion of large vehicles in the roundabout circulating lane.
- Approaching cyclists on Airport Way are directed to a 1.5m concrete sidewalk. Normally, a shared pedestrian / cyclist sidewalk is a minimum of 2.5m to 3.0m wide. If the desire is to direct cyclists to the travel lane and have them ride through the roundabout, shared road pavement markings and "Share the Road" signs should be installed.
- A drainage issue exists on the westbound Airport Way bike lane approach to the sidewalk ramp, as ponding was observed in this area.
- The south leg currently has no sight distance restriction, but this should be considered when the property in the southwest quadrant develops. The north and east leg approaches may have a slight sight distance deficiency, which can be easily rectified with landscape maintenance.
- Sight distance on Airport Way at the west approach to the roundabout appears to be limited by an embankment in the northwest quadrant. Heavy vehicles approaching eastbound on Airport Way were observed to hesitate, begin to accelerate and then suddenly brake near the yield line as they saw an approaching vehicle from the north.
- The available sight distance on the west leg appears to be very close to the minimum requirement. Sight distance may benefit from relocating the existing porta-potty to a different location.

Transit, Pedestrian and Bicycle Access

Pedestrian movements were observed and existing transit and pedestrian / bicycle facilities, such as sidewalks, cross walks, bike lanes etc. were documented during the site visit.

Bus route C41 Meadowtown / Maple Meadows station is the only route serving the South Bonson community. It is recommended that as the population grows and South Bonson Area develops, the City should work with TransLink to determine if an additional bus route, more frequent bus service, or extension of the current route are required to better serve the South Bonson Area. Based on the current and future transit demand, two bus shelters on either side of Bonson Road at the Athletic Park access are recommended to be installed.

In order to ensure that the sidewalk and bike lane network in South Bonson community is complete and facilitates continuous connections and safe pedestrian flow to GEBP, Athletic Park, and Pitt Meadows Secondary School, bike lanes and sidewalks are recommended to be implemented as the developments are constructed in the study area. In addition, considering the expected future increase in pedestrian activity due to residential development and Elementary school, a crosswalk is recommended on Bonson Road at the Athletic Park entrance. This crosswalk is considered important for pedestrian / bike flow connecting the multiuse pathway across the Bonson Road.

All existing and proposed pedestrian and bicyclist facilities are shown in **Figure ES1**.

Recommended Upgrades

All recommended upgrades have been costed using high level Wolski Cost Estimating Methodology. **Table ES3** summarizes the upgrades with cost estimates.

Table ES3 Summary of Recommended Upgrades with Costs

Location	Upgrade Description	Cost estimate	Comments
Airport Way between Baynes Road and Golden Ears Way	<ul style="list-style-type: none"> Four Lane widening 	\$4,268,505	Widening to be completed by 2021
Airport Way / Harris Road Intersection	<ul style="list-style-type: none"> Option 1 - Conversion from one lane to two lane roundabout Option 2 - Intersection Signalization 	\$1,318,937 \$1,614,720	2 approach lanes in all four directions and 1 receiving lane along Harris Road exits 4-lane widening not required by 2021 for signal option. Cost estimate shown for 2031 configuration.
Airport Way / Bonson Road Intersection	<ul style="list-style-type: none"> Option 1 - Conversion from one lane to two lane roundabout Option 2 - Intersection Signalization 	\$1,154,156 \$1,449,940	By 2021, 2 approach lanes along Airport Way and a 1 approach lane for NB and SB directions. By 2031, 2 approach lanes in all four directions. Cost estimate shown for 2031 configuration. 4-lane widening not required by 2021 for signal option
Airport Way / Southgate Road Intersection	Pedestrian Crossing as the traffic is significantly increased due to future planned developments.	\$175,000	Installation subject to meeting pedestrian signal warrant
Harris Road / fieldstone Walk Intersection	Signalized crosswalk as the traffic is significantly increased due to future planned developments	\$175,000	Installation subject to meeting pedestrian signal warrant
Bonson Road @ Athletic Park Entrance	Marked Pedestrian crosswalk	\$15,000	
Sidewalks	Harris Road – east side between Fraser Way and Airport Way	\$126,254	
	Harris Road – both east and west side between Airport Way and Fieldstone Walk	\$216,568	
	Sutton Avenue - North side between Lasser Road to Bonson Road	\$126,254	
Bike lanes	Bonson Road – between Sutton Avenue to Hammond Road	\$16,886	On street painted bike lanes using existing pavement structure. No lane

Bus Shelters	<ul style="list-style-type: none">Harris Road – between Fraser Way and Airport WayTwo bus shelters on Bonson Road (Figure 17)	\$9,698 \$80,000	widening is assumed. Cost includes paint lines and signing.
Total with Option 1		\$7,682,258	
Total with Option 2		\$8,273,825	



SOUTH BONSON TRAFFIC STUDY

FIGURE ES1 - RECOMMENDED IMPROVEMENTS

1. Introduction

The South Bonson Community in Pitt Meadows is currently a predominantly residential neighbourhood. However, the future planned development of Golden Ears Business Park (GEBP) and other residential / institutional land uses along Airport Way will change the nature of the traffic pattern from an exclusively residential neighbourhood to a mixed use area. Due to its linkage to the Golden Ears Bridge, Airport Way has become the main access to the Golden Ears Connector system in the southern area of Pitt Meadows and is considered a new gateway into the community. The future developments will see an increase in traffic volumes in the South Bonson area.

McElhanney was commissioned to prepare a Traffic Study for the South Bonson Area to assess the impacts of future developments on the performance on road network, intersection control methods, and pedestrian safety/ accessibility.

1.1. Study Area

The study area limits are:

- Airport Way from Baynes Road in the west to Southgate Road in the east.
- Bonson Road from Sutton Avenue in the south to Hammond Road in the north.
- Harris Road from Fraser Way in the south to Fieldstone Walk in the north.

Figure 1 shows the study area.

Figure 1 South Bonson Study Area



Source: Google Maps

1.2. Study Objective

The purpose of this study is to assess the impacts of proposed future developments on the performance of the road network, intersection control methods, and pedestrian accessibility in the South Bonson neighborhood in the City of Pitt Meadows.

This report will focus on:

- Future development and growth for years 2021 and 2031 (full build-out);
- Traffic operations at eight (8) intersections;
- Pedestrian access throughout the neighbourhood; and
- Traffic control elements.

Eight (8) study intersections were selected for evaluation:

1. Airport Way / Harris Road (roundabout)
2. Airport Way/ Bonson Road (roundabout)
3. Airport Way / Southgate Road

4. Harris Road / Fieldstone Walk
5. Boson Road / Hammond Road (signal)
6. Bonson Road / 116B Ave
7. Bonson Road / 116A Avenue
8. Bonson Road / Sutton Avenue

The following study horizons were analyzed for weekday AM and PM peak hours:

- Existing Conditions (2016)
- Short Term Horizon Year (2021)
- Long Term Horizon Year (2031)

The City has also identified the following for review in the study:

- Operational and safety performance for the Bonson / Airport roundabout; particularly pedestrian movements, sight line, traffic conflict, operating speed, etc.
- Right-in-right-out operations at the proposed residential development access on Airport Way.
- Pedestrian safety and connectivity from Bonson Road to the Pitt Meadows Athletic Park.
- Potential impacts to transit services and bicycle facilities.

1.3. Future Development Description / Assumptions

As per the study's Terms of Reference, the following is assumed:

- All currently approved developments are assumed to be completed in short term horizon, i.e. by 2021: and
- Complete buildout of the City of Pitt Meadows Official Community Plan (OCP) in the long term horizon, i.e. by 2031.

After review of the OCP and consultation with the city staff, the expected developments to be completed in the short and long terms are summarized in **Table 3** and shown in **Figure 2**.

Table 1 Development Summary

Development	Size	Completion by 2021	Completion by 2031
GEBP Phase 2	1,156,000 sqft	100%	-
GEBP Phase 3	886,400 sqft	50%	100%
GEBP Phase 4	981,300 sqft	50%	100%
19451 Sutton Avenue Residential	248 Units Townhome	100%	-
School at SW quadrant of Airport Way / Bonson Rd	15,000 sqft	0%	100%

Figure 2 Future Development



1.4. Roadway Network

Based on the 2009 City of Pitt Meadows Official Community Plan, the functional classifications of the major roadways within the proposed project area are as follows.

1.4.1. Arterial Roads

Airport Way

Airport Way is the main access to the Golden Ears Bridge system in the south area of Pitt Meadows and has become a new gateway into the community. This road will see an increase in traffic volumes as all the planned developments are built. It has a current posted speed limit of 50 kph east of Bonson Road and 60 kph west of Bonson Road. The current two lane cross-section is planned to be widened to four lanes. Airport Way has bike lanes in both east and westbound directions.

Harris Road

Harris Road is a primary north-south arterial in the South Bonson area which connects Fraser Way to Lougheed Highway. It is a two-lane arterial road with a posted speed of 50 km/h and bike lanes on each direction north of Airport Way.

1.4.2. Collector Roads

Bonson Road

Bonson Road is a primary two lane north-south collector road in the South Bonson community connecting local roads between Fraser Way and Hammond Road. It has sidewalks on each side between Sutton Avenue and Hammond Road.

The *City of Pitt Meadows Official Community Plan (2009)* road classification map is included in [Appendix A](#).

1.5. Existing (2016) Traffic Volumes

Weekday AM and PM peak period turning movement counts at the eight study intersections, listed in [Section 1.2](#), were recorded between Wednesday, January 27, 2016, and Tuesday, February 2, 2016, by Creative Transportation Solutions (CTS). Weekday AM peak traffic volumes were recorded from 7 AM to 9 AM, weekday PM peak volumes from 2:30 PM to 6 PM. Based on the peak period counts, the peak hour (hour of highest traffic volumes within the peak period) was used for analysis at each study intersection. The AM peak hour fell between 7:45 and 8:45, and the PM peak hour was observed between 4:15 to 5:15. The afternoon count was started at 2:30 to capture after school traffic peak. Vehicular traffic in and out of 116B Avenue increased between morning and afternoon school peak hours. It is noted that the morning school peak hour coincides with the traffic peak hour; however, the afterschool peak traffic was lower than in the PM peak hour.

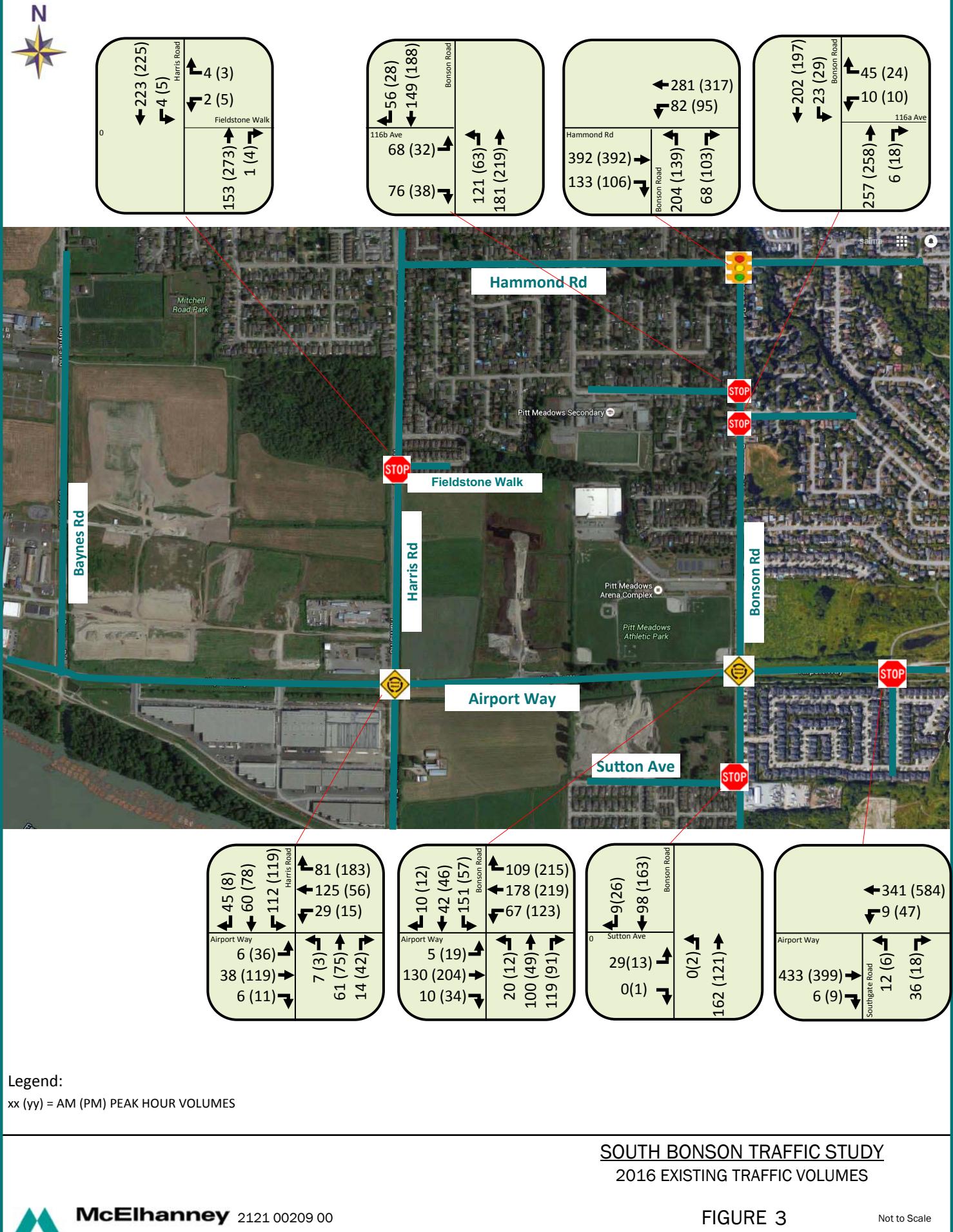
Existing (2016) peak hour traffic volumes at the study intersections are shown in [Figure 3](#). Detailed intersection volume counts can be found in [Appendix B](#).

1.5.1. Pedestrian Count / Observations

A pedestrian count was also conducted at the same time as the traffic counts. A pedestrian count at the Bonson Road / 116A / 116B Avenue intersection shows a surge in pedestrian activity between 8:00 and 8:30 in the morning and between 2:30 and 3:15 in the afternoon due to school drop off / pickup at Pitt Meadows Secondary school on 116B Avenue. The total intersection pedestrian count increased from 6 pedestrians between 7:30 and 8 am, to 28 pedestrians between 8 and 8:30 am. Similarly, 105 pedestrians were recorded at the intersection between 2:30 to 3:30 pm, dropping to 25 between 3:30 - 4:30 pm. Most of the pedestrians observed on Bonson Road were school children. No unsafe pedestrian / traffic conflicts were observed.

1.5.2. Heavy Vehicle Traffic

The existing counts in the study area show a relatively low Heavy Vehicle percentage (HV%), accounting for about 2% of the overall traffic. However, the HV% is expected to increase with the construction of a Business Park in the study area, especially along the Airport Way and Harris Road corridors. Assuming 10% heavy vehicles for future GEBP development trips, the estimated HV% in the combined traffic scenarios will be about 7%.



2. Trip Generation, Distribution and Assignment

2.1. Trip Generation

Project trip generation refers to the process for estimating the amount of vehicular traffic a development would add to the surrounding roadway system. The total amount of traffic entering and exiting from the new development is calculated for an average weekday, and separate estimates are created for each of the peak hours (AM, PM) when traffic volumes on the surrounding streets are highest. Project traffic includes both new traffic generated by the project and traffic that would already be on the adjacent roadways but the driver decides to stop at the site (referred to as “pass-by” trips). However, because the majority of the land use in the South Bonson area is residential or light industrial, and all of the anticipated development is residential or light industrial, no pass-by reduction was assumed.

Future estimated development for the South Bonson Area was provided by the City. To determine the number of trips generated by the expected developments, trip generation rates from the *Institute of Transportation Engineering (ITE) Trip Generation Manual*, 9th Edition (2012) were used. The *ITE Trip Generation Manual* is the industry standard for determining trip generation of future developments. It is a compilation of information about vehicular traffic that is generated by different land uses, based on observations of how many vehicles enter and exit a site devoted to a particular land use.

Trip generation calculations were performed for Future Years 2021 and 2031. **Table 2** shows the ITE average trip generation rates. As the development size increases the average rates tend to over/underestimate expected trips and the ITE fitted curve equation becomes a more realistic traffic estimate. The following ITE fitted curve equations were used for GEBP to estimate the generated trips.

$$\text{AM Peak hour} \quad \text{Ln}(T) = 0.79\text{Ln}(X) + 0.91$$

$$\text{PM Peak hour} \quad T = 0.78 (X) + 30.48$$

where T = Generated trips and X = Development size in 1000's of sqft

Table 3 summarizes the estimated, overall, trip generation for the anticipated development in the South Bonson Neighbourhood.

Table 2 ITE Trip Generation Rates

Land Use Description	ITE Land Use	ITE Land Use Code	Units	AM Peak Hour			PM Peak Hour		
				Average Rate	In	Out	Average Rate	In	Out
GEBP (Phase 2 to 4)	Industrial Park	130	Trips/1000 ft ²	0.82	82%	18%	0.85	21%	79%
19451 Sutton Ave Development	Residential Condo / Townhomes	230	DU	0.44	17%	83%	0.52	67%	33%
School	Elementary school	520	Trips/1000 ft ²	5.20	56%	44%	3.11	44%	56%

Table 3 Estimated Trip Generation

Land Use Description	Size	Units	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
2021 Trip Generation								
GEBP Phase 2	1,156	1000 ft ²	653	535	118	932	196	736
GEBP Phase 3 (50%)	443	1000 ft ²	306	251	55	376	79	297
GEBP Phase 4 (50%)	491	1000 ft ²	332	272	60	413	87	326
19451 Sutton Ave Development	248	DU	110	19	91	129	86	43
Total			1401	1077	324	1850	448	1402
2031 Trip Generation								
GEBP Phase 2	1,156	1000 ft ²	653	535	118	932	196	736
GEBP Phase 3	886	1000 ft ²	529	434	95	722	152	570
GEBP Phase 4	981	1000 ft ²	573	470	103	796	167	629
19451 Sutton Ave Development	248	DU	110	19	91	129	86	43
School	15	1000 ft ²	78	44	34	47	21	26
Total			1943	1502	441	2626	622	2004

Notes: DU = Dwelling Units

The proposed developments expected to be completed by 2021 are estimated to generate an additional 1,401 weekday AM peak hour trips (1,077 inbound and 324 outbound), and 1,850 weekday PM peak hour trips (448 inbound and 1,402 outbound).

Compared to 2016 traffic condition, the proposed developments completed by 2031 are expected to generate an additional 1,943 weekday AM peak hour trips (1,502 inbound and 441 outbound), and 2,626 weekday PM peak hour trips (622 inbound and 2,004 outbound).

2.2. Trip Distribution & Assignment

The directional distribution (origin / destination) of proposed development trips is presented in **Table 4**. This traffic distribution is similar to the one used in the previous Traffic Impact Assessment report by EBA Consulting for GEBP Phase 2 and also in the MMM Group's GEBP Phase 3 / 4 Transportation Impact Study, 2015, and remains applicable for the purposes of this study. Trip distribution is shown schematically in **Figure 4**.

Table 4 Trip Distribution

Direction	Trip Distribution
East on Airport Way towards Golden Ears Way	50%
West on Airport Way towards Bayne Road	0%
North on Harris Road towards Lougheed Highway	30%
North on Bonson Road towards Hammond Road	15%
South on Harris Road towards Fraser Way	5%
Total	100%

Figure 4 Trip Distribution



3. Future Traffic

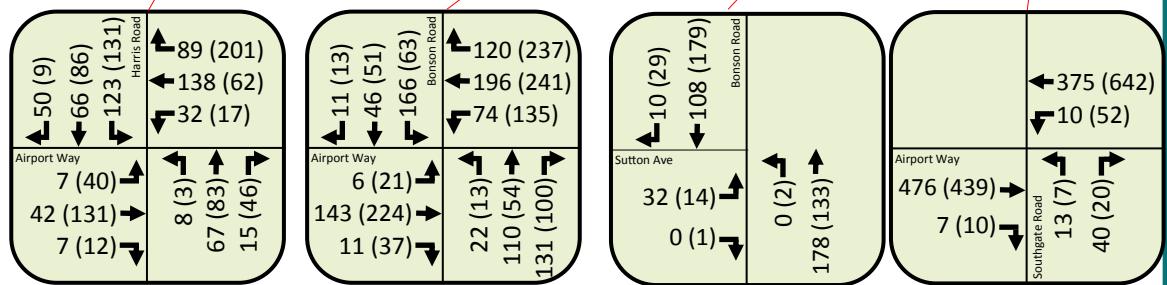
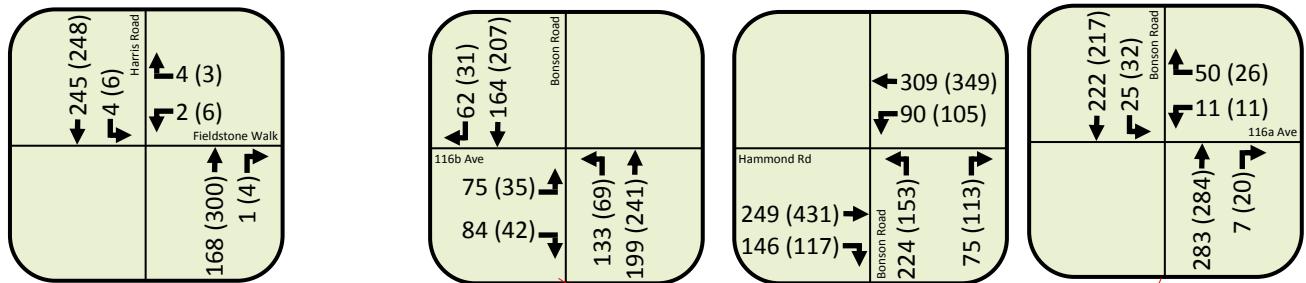
3.1. Growth Rate

Previous traffic impact studies in the area suggested that the traffic volumes along Airport Way increased from 2009 to 2012 after the opening of the Golden Ears Way interchange. However, after 2012 there has been no traffic growth. Based on discussions with the City, a 2% per year linear growth was used to determine background traffic volumes for Future Years 2021 and 2031. This growth rate will result in slightly conservative traffic estimates. The 2021 and 2031 Background traffic volumes can be found in **Figures 5** and **6**, respectively.

3.2. Future Year 2021 and 2031 Traffic Volumes

To determine the 2021 and 2031 background traffic volumes at the study intersections, the 2% per year traffic growth rate was applied to the Existing Conditions (2016) traffic volumes. The calculated trips generated by the expected developments were assigned to the network, and then added to the background traffic to estimate the total future combined volumes for 2021 and 2031.

Future Years 2021 and 2031 Development volumes and the combined intersection volumes can be found in **Figures 7** and **10**, respectively.



Legend:

xx (yy) = AM (PM) PEAK HOUR VOLUMES

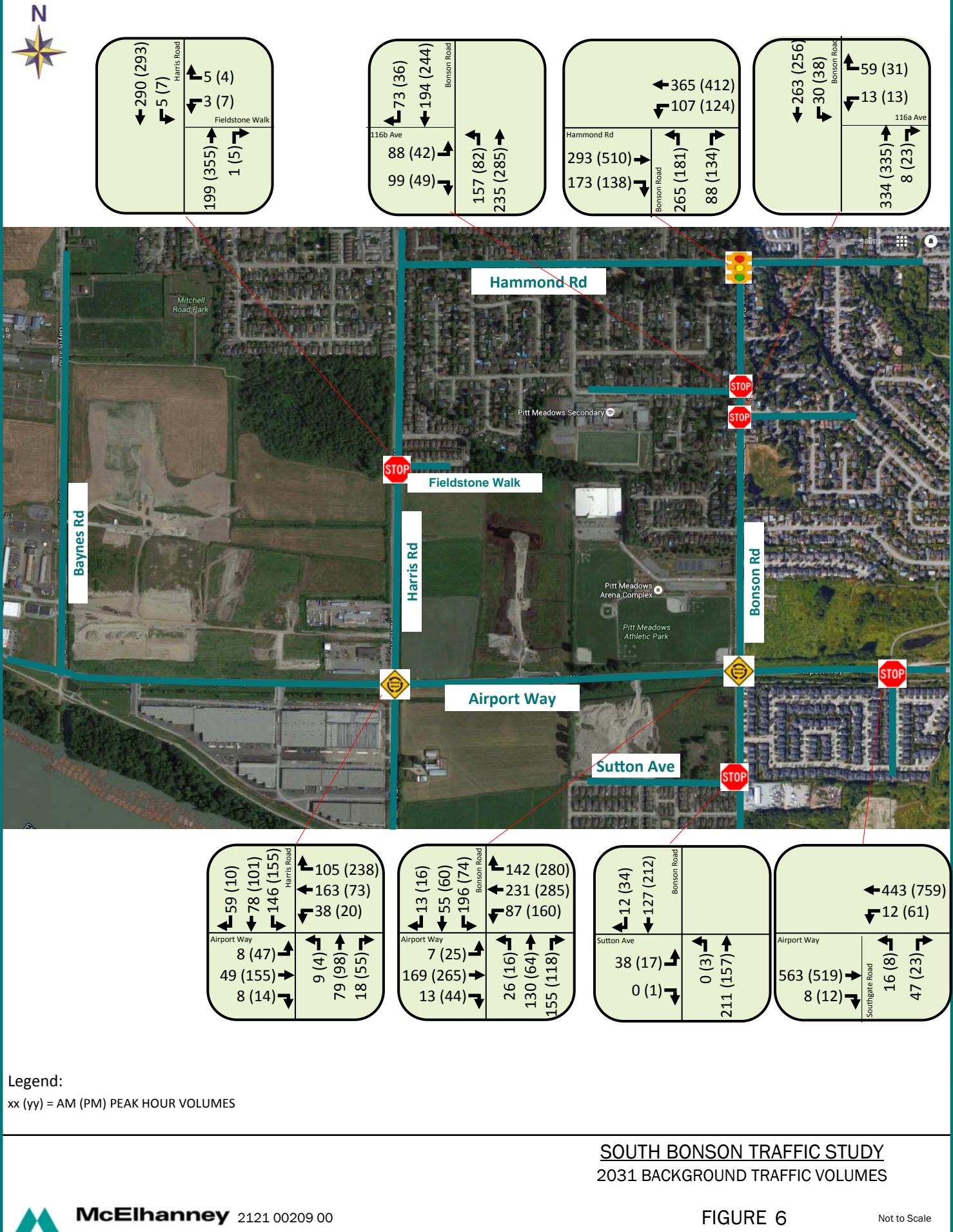
SOUTH BONSON TRAFFIC STUDY 2021 BACKGROUND TRAFFIC VOLUMES

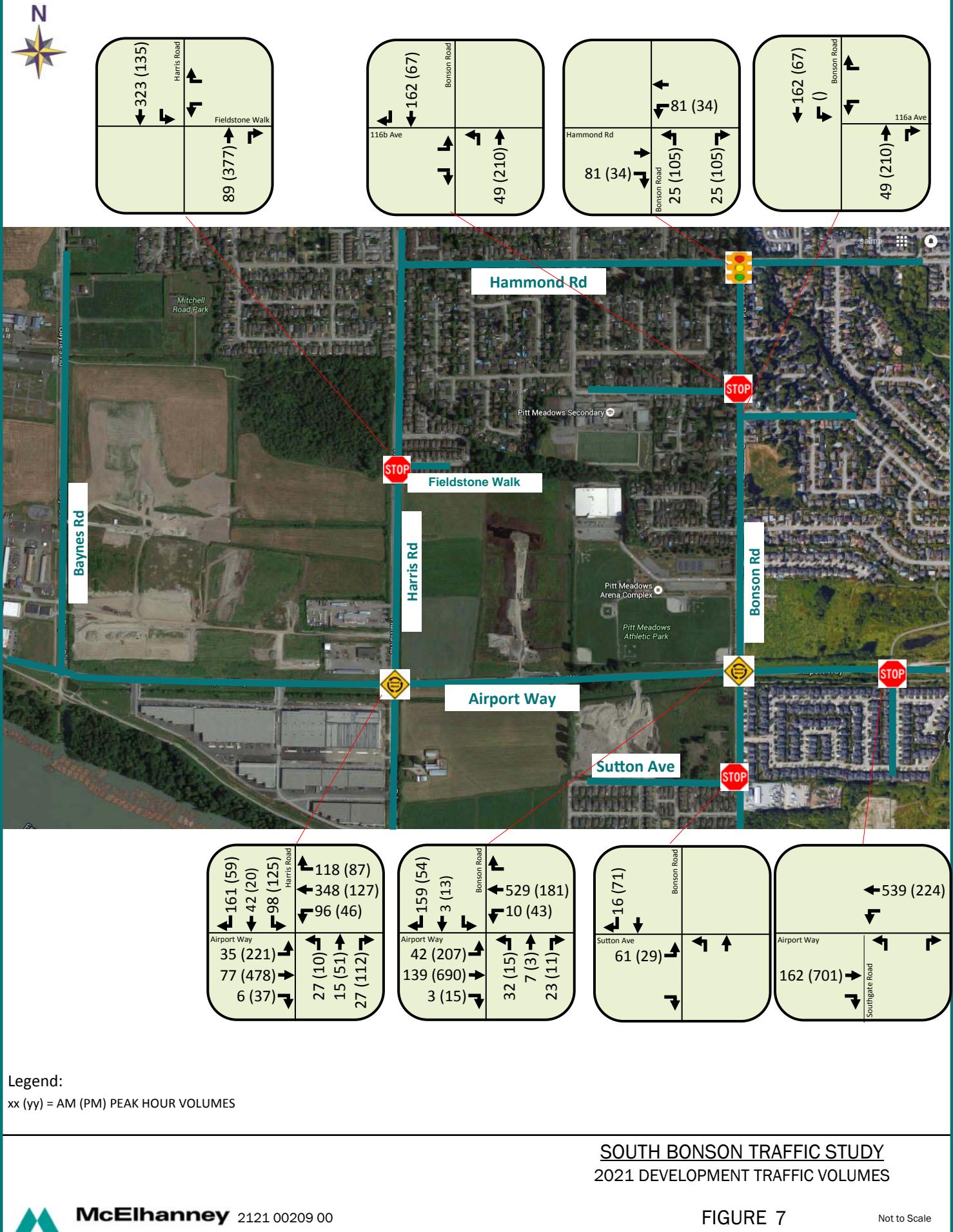


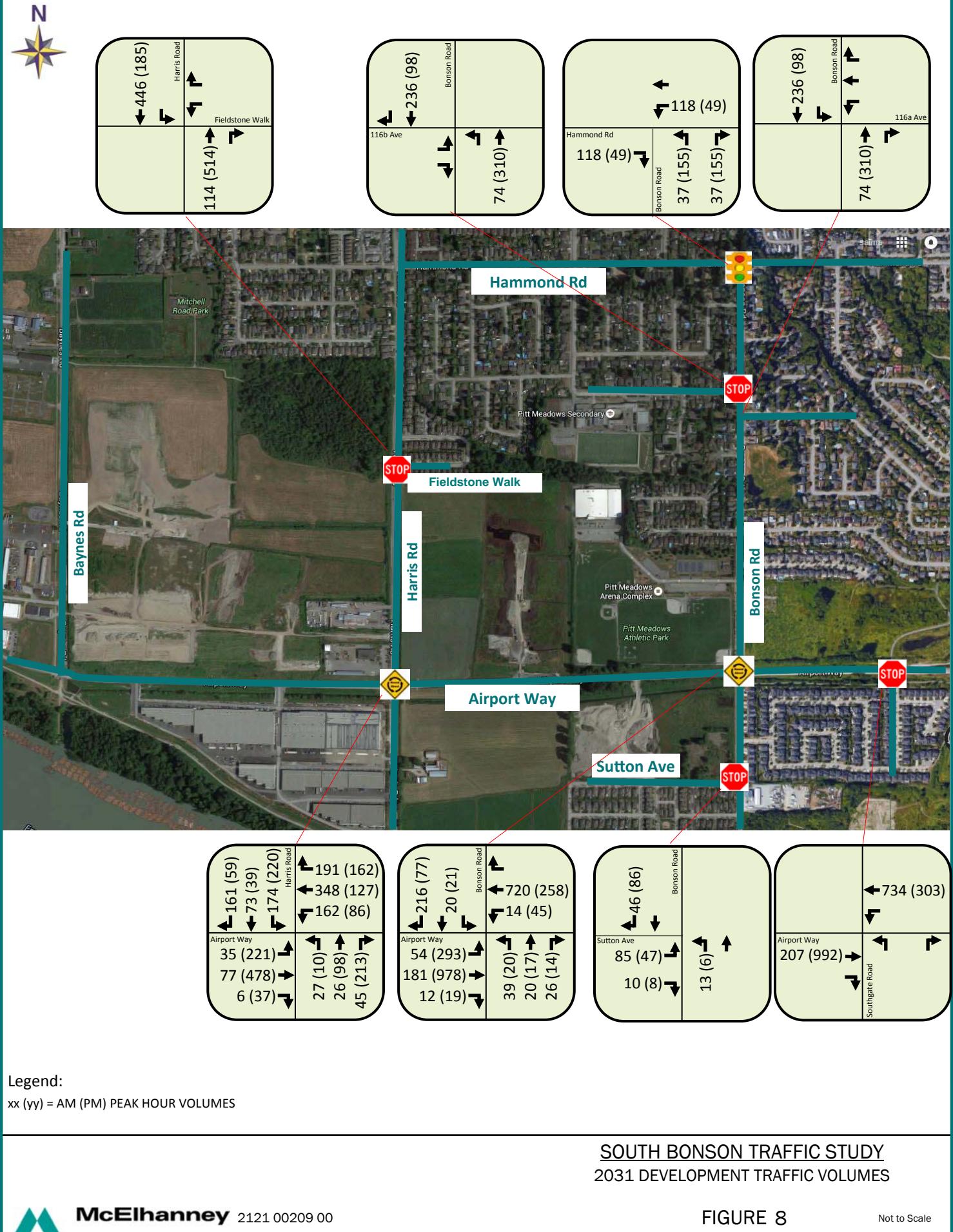
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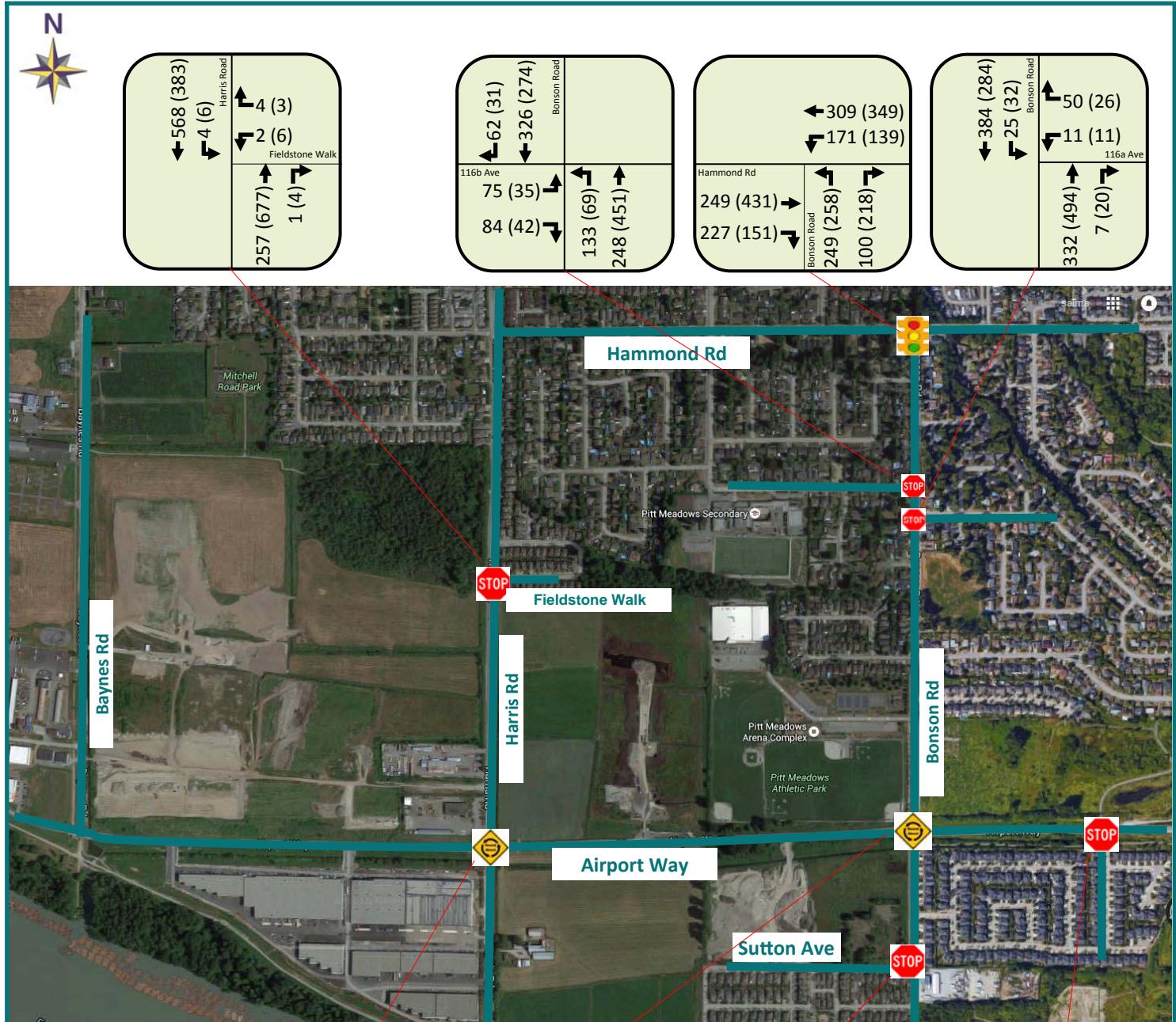
Not to Scale







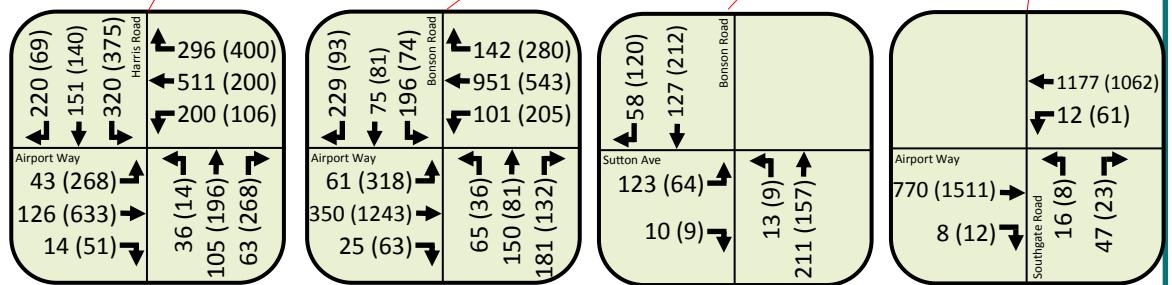
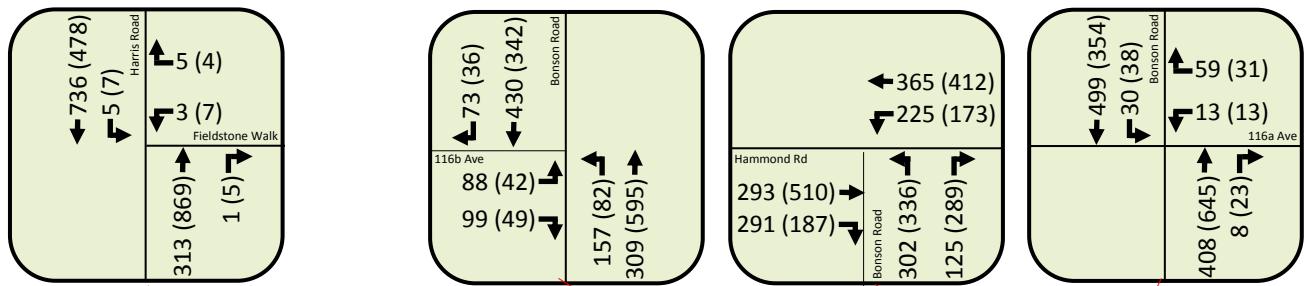
McElhanney 2121 00209 00



Legend:

xx (yy) = AM (PM) PEAK HOUR VOLUMES

SOUTH BONSON TRAFFIC STUDY 2021 COMBINED TRAFFIC VOLUMES



Legend:

xx (yy) = AM (PM) PEAK HOUR VOLUMES

SOUTH BONSON TRAFFIC STUDY
2031 COMBINED TRAFFIC VOLUMES

4. Traffic Operations Analysis

4.1. Intersection Level of Service Criteria

Roadway facility traffic operations are described in terms of Level of Service (LOS). LOS is a commonly used measure of the quality of traffic conditions experienced along a roadway or at an intersection. The Level of Service is typically measured as a function of the control delay per vehicle (seconds / vehicle). Six service levels are defined ranging from LOS A, the best operating conditions, to LOS F, the worst operating conditions. LOS E corresponds to “at or near capacity” operations. When volumes exceed capacity, stop-and-go conditions result and operations are designated LOS F. The typical urban criterion for acceptable intersection operation is LOS D.

4.1.1. Signalized Intersections

The signalized intersections were analyzed using the methodology contained in the Highway Capacity Manual (HCM). This methodology determines the level of service by comparing the average control delay for all vehicles approaching the intersection to the delay thresholds shown in **Table 5**.

4.1.2. Unsignalized Intersections

For unsignalized intersections, the level of service calculations were conducted using the method in Chapter 19 of the Highway Capacity Manual (HCM) 2010 (Transportation Research Board, 2010). The LOS rating is based on the average control delay expressed in seconds per vehicle. For controlled approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. **Table 5** presents the thresholds for unsignalized intersections.

Table 5 Level of Service & Delay Criteria for Unsignalized Intersections

LOS	Delay Criteria (sec/veh)		Description
	Signalized	Unsignalized	
A	<10	<10	Represents free flow. Individual users are virtually unaffected by others in the traffic stream.
B	>10 and <20	>10 and <15	Stable flow, but the presence of other users in the traffic stream begins to be noticeable.
C	>20 and <35	>15 and <25	Stable flow, but the operation of individual users becomes significantly affected by interactions with others in the traffic stream.
D	>35 and <55	>25 and <35	Represents high-density, but stable flow.
E	>55 and <80	>35 and <50	Represents operating conditions at or near the capacity level.
F	>80	>50	Represents forced or breakdown flow.

4.1.3. Synchro Software

Synchro was used to calculate the LOS and average delay at the study intersections, based on HCM methodologies for unsignalized / signalized intersections. Synchro is a traffic simulation modeling software used to determine traffic conditions based on volumes, laning, and type of traffic control. The model calculates the average delays and queue lengths for each movement at an intersection. Average delays are translated into a LOS.

4.1.4. Sidra Software

Sidra was used to model the roundabouts in the study area. Similar to Synchro, Sidra is also based on the HCM methodologies and is recognized as an industry standard software for roundabout capacity analysis.

4.2. Intersection Results

A summary of the overall intersection performance in terms of LOS, and average delays in seconds/vehicle (s/v) for each study intersection is shown in **Table 6**. Individual movement LOS, delay and 95th percentile queue length (in metres) for the Existing Conditions (2016) and Future Years 2021 and 2031 scenarios are presented in the following sections. Synchro / SIDRA output sheets are included in **Appendix C**.

Table 6 Intersection Performance Summary

Location	Control Type ⁽¹⁾	Peak	2016		2021 Background		2031 Background		2021 Combined		2031 Combined	
			LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)
Airport Way / Harris Road	RA	AM	A	1.4	A	7.2	A	8.5	F	74.4	F	159.5
		PM	A	7.2	A	7.8	A	9.3	F	133.6	F	237.7
Airport Way / Bonson Road	RA	AM	B	11.4	B	13.6	C	21.5	F	85.1	F	199.5
		PM	B	12.7	C	16.0	D	30.9	F	214.6	F	418.2
Airport Way / Southgate Road	SSSC	AM	A	0.9	A	0.9	A	1.1	A	1.0	A	1.9
		PM	A	1.0	A	1.2	A	1.5	A	2.2	A	6.7
Bonson Road / Hammond Road	Signal	AM	B	15.2	B	16.9	B	19.4	C	22.7	C	29.5
		PM	C	22.0	C	25.2	C	22.6	C	23.0	C	28.5
Bonson Road / 116a / 116b Ave	SSSC	AM	A	4.9	A	5.3	A	6.4	A	5.5	A	9.6
		PM	A	2.5	A	2.6	A	2.9	A	2.3	A	3.0
Bonson Road / Sutton Ave	SSSC	AM	A	1.1	A	1.1	A	1.1	A	2.6	A	3.4
		PM	A	0.5	A	0.5	A	0.5	A	1.1	A	1.8
Harris Road / Fieldstone Walk	SSSC	AM	A	0.2	A	0.2	A	0.2	A	0.2	A	0.2
		PM	A	0.3	A	0.3	A	0.3	A	0.3	A	0.3

Notes:

1. RA = Roundabout
SSSC = Side-street stop-controlled
- Bold** indicates unacceptable operation (LOS E or F)

4.2.1. Airport Way / Harris Road (Roundabout)

Airport Way / Harris Road intersection is currently operating as a single lane roundabout with one entry and one exit lane on all four approaches. Sidra results for intersection performance are summarized in [Table 7](#).

The results show that the intersection will perform at an acceptable LOS in the 2031 background traffic condition; however, with the combined traffic (background plus development), the LOS drops to F by 2021. A single lane roundabout is inadequate to accommodate the future traffic and the intersection will need capacity upgrades.

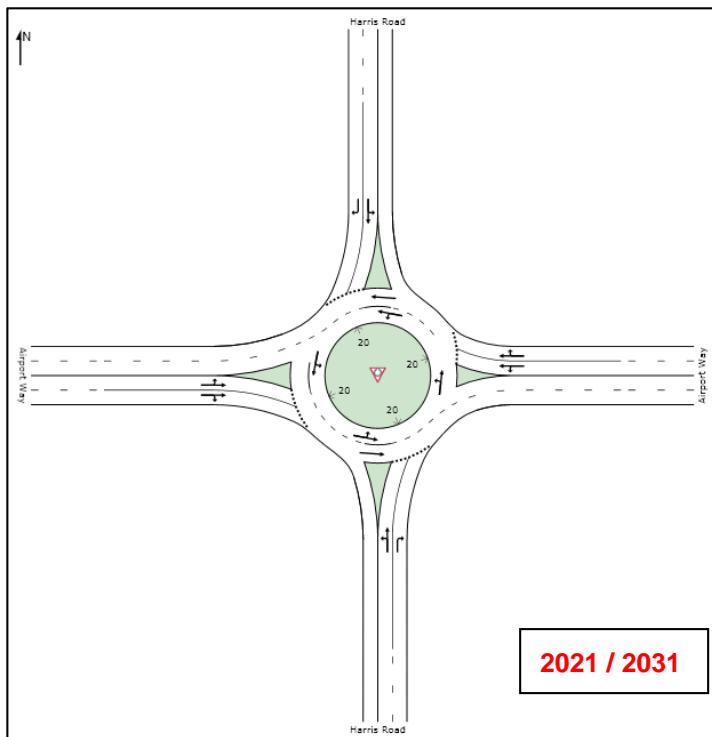
Mitigations

In order to mitigate the poor roundabout operation, two options were analyzed: Option 1 includes upgrade to a two-lane roundabout and Option 2 involves intersection signalization.

Option 1 - 2-Lane Roundabout

Four-laning of Airport Way is assumed to be completed by 2021 with the 2-lane roundabout option. A two-lane roundabout was tested in Sidra and the results revealed it will accommodate future traffic demand at an acceptable LOS, as shown in [Table 8](#), except Harris Road SB (AM) and Harris Road NB (PM) in 2031 Combined case. The reported performance for the recommended two lane roundabout is based on 2 approach lanes in all four directions and one receiving lane along the Harris Road approaches, as shown in [Figure 11](#). The two lane roundabout will require some property acquisition, possibly, in all four quadrants of the intersection. The exact property take can be determined based on the final roundabout design and 4-lane widening of the Airport Way.

Figure 11 Option 1 Proposed Laning – Airport Way / Harris Road Intersection



Option 2 – Intersection Signalization

An intersection signal option was also tested and the results revealed that signal will also accommodate the 2021 and 2031 combined traffic at acceptable LOS. It is noted that in 2021, the signalized intersection will not require a four-lane cross-section along Airport Way; however, queue lengths are expected to be longer than the 2-lane roundabout option. In 2031 the signalized intersection will require a 4-lane cross-section along Airport Way. The signalized intersection option will also require some property acquisition, but is expected to have a smaller footprint as compared to a two lane roundabout. Furthermore, the signalized intersection will accommodate the pedestrian/bike movements in a more safe/controlled manner with help of pedestrian push buttons/phases as compared to a two-lane roundabout. The proposed laning in 2021 and 2031 is shown in **Figure 12**. The results are included in **Table 8**.

A signal warrant was conducted using Transportation Association of Canada (TAC) methodology and the results show that a signal is warranted based on the projected 2021 and 2031 combined volumes. The results of the Signal Warrant analysis are included in **Appendix D**.

Figure 12 Option 2 Proposed Laning – Airport Way / Harris Road

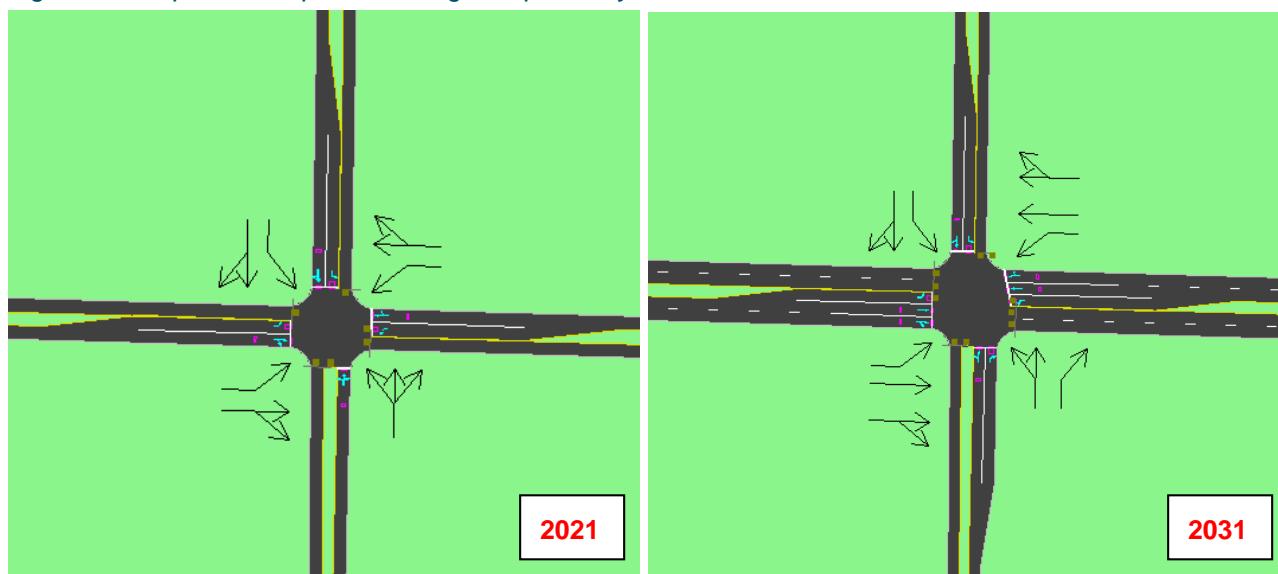


Table 7 Intersection Performance - Airport Way / Harris Road

Scenario	Peak Period	MOE	Airport Way		Harris Road	
			EB	WB	NB	SB
2016 existing	AM	LOS	A	A	A	A
		Delay	5.1	6.7	5.3	7.6
		95% Queue	2.3	10.4	0.5	11.1
	PM	LOS	A	A	A	A
		Delay	7.4	7.8	7.2	6.3
		95% Queue	8.8	12.5	6.8	9.1
2021 Background	AM	LOS	A	A	A	A
		Delay	5.4	7.2	5.6	8.4
		95% Queue	2.7	12.1	4.3	2.7
	PM	LOS	A	A	A	A
		Delay	8.1	8.6	7.9	6.7
		95% Queue	10.2	14.7	7.9	10.5
2031 Background	AM	LOS	A	A	A	B
		Delay	5.9	8.3	6.2	10.1
		95% Queue	3.3	15.7	5.4	17.4
	PM	LOS	A	B	A	A
		Delay	9.7	10.4	9.5	7.6
		95% Queue	13.5	19.7	10.5	13.4
2021 Combined	AM	LOS	A	F	A	F
		Delay	9.2	64.0	8.1	131
		95% Queue	8.7	342	7.4	330
	PM	LOS	F	D	E	B
		Delay	282	27.8	43.4	13.6
		95% Queue	1052	68.6	45.3	30.0
2031 Combined	AM	LOS	B	F	A	F
		Delay	10.8	168.4	9.9	230
		95% Queue	10.3	885	10.4	680
	PM	LOS	F	F	F	D
		Delay	513	69.2	186	34.2
		95% Queue	1488	264	388	91.0

Table 8 Intersection Performance with Upgrades – Airport Way / Harris Road

Mitigation Option	Scenario	Peak Period	MOE	Airport Way		Harris Road	
				EB	WB	NB	SB
2-Lane Roundabout	2021 Combined <i>(1-receiving lane on Harris Rd)</i>	AM	LOS	A	B	A	B
			Delay	6.5	11.1	6.2	14.7
		PM	95% Queue	2.9	21.9	3.5	18.6
			LOS	D	B	C	A
	2031 Combined <i>(1-receiving lane on Harris Rd)</i>	AM	Delay	28.5	12.6	17.5	7.5
			95% Queue	55.7	19.1	10.4	8.1
		PM	LOS	A	C	A	E
			Delay	8.2	15.3	7.3	37.1
Signal	2021 Combined <i>(1-approach lane on Airport Way)</i>	AM	95% Queue	3.6	38.3	4.7	64.0
			LOS	D	C	E	C
			Delay	35.0	21.4	40.7	16.5
		PM	95% Queue	51.0	42.8	30.3	33.4
			LOS	A	C	B	B
			Delay	9.1	21.5	15.3	18.2
	2031 Combined <i>(2-approach lanes on Airport Way)</i>	PM	95% Queue	15.8	#136	25.6	43.3
			LOS	D	D	D	D
			Delay	35.4	52.2	48.6	42.2
		AM	95% Queue	#177	#145	#91	#76.6
			LOS	B	C	C	C
			Delay	15.9	22.0	21.3	21.1
		PM	95% Queue	14.0	#84.5	33.9	#69.9
			LOS	C	B	C	D
			Delay	31.0	13.8	23.0	35.0
			95% Queue	77.2	32.5	54.9	#103

Recommendation

Based on the better intersection performance results, safer pedestrian/ bike accommodations and lower property footprint, the signalized intersection option is recommended at this intersection.

4.2.2. Airport Way / Bonson Road (Roundabout)

Airport Way / Bonson Road intersection is currently operating as a single lane roundabout with one entry and one exit lane on all four approaches. Sidra results for this intersection for all study scenarios are summarized in **Table 9**.

Table 9 Intersection Performance - Airport Way / Bonson Road

Scenario	Peak Period	MOE	Airport Way		Bonson Road	
			EB	WB	NB	SB
2016 existing	AM	LOS	A	B	B	A
		Delay	7.1	13.4	12.2	8.9
		95% Queue	6.6	32.2	23.2	11.4
	PM	LOS	A	C	A	A
		Delay	9.2	16.7	7.0	7.7
		95% Queue	14.1	53.5	6.7	5.6
2021 Background	AM	LOS	A	C	B	B
		Delay	7.8	16.6	14.6	10.1
		95% Queue	7.7	43.7	30.2	13.8
	PM	LOS	B	C	A	A
		Delay	10.4	21.9	7.6	8.4
		95% Queue	17.1	83.2	7.7	6.6
2031 Background	AM	LOS	A	D	C	B
		Delay	9.4	28.7	23.0	13.1
		95% Queue	10.0	84.3	51.6	20.8
	PM	LOS	B	E	A	B
		Delay	13.6	47.8	9.0	10.4
		95% Queue	26.6	279	10.1	8.8
2021 Combined	AM	LOS	B	F	C	F
		Delay	12.1	148	18.6	54.2
		95% Queue	20.8	726	27.8	74.8
	PM	LOS	F	F	C	B
		Delay	362	96.7	17.5	12.8
		95% Queue	1611	465	16.2	12.7
2031 Combined	AM	LOS	C	F	D	F
		Delay	16.5	353	35.0	123
		95% Queue	35.2	1591	53.1	284
	PM	LOS	F	F	C	C
		Delay	661	226	22.9	15.5
		95% Queue	2881	1064	24.2	18.6

The results show that the intersection will perform at acceptable LOS with background traffic in 2021 and the WB movement will experience LOS E in 2031. With the combined traffic, the intersection will operate at poor LOS E and F in all directions except the northbound direction. A single lane roundabout will not be able to accommodate the future traffic demand and will need capacity improvements.

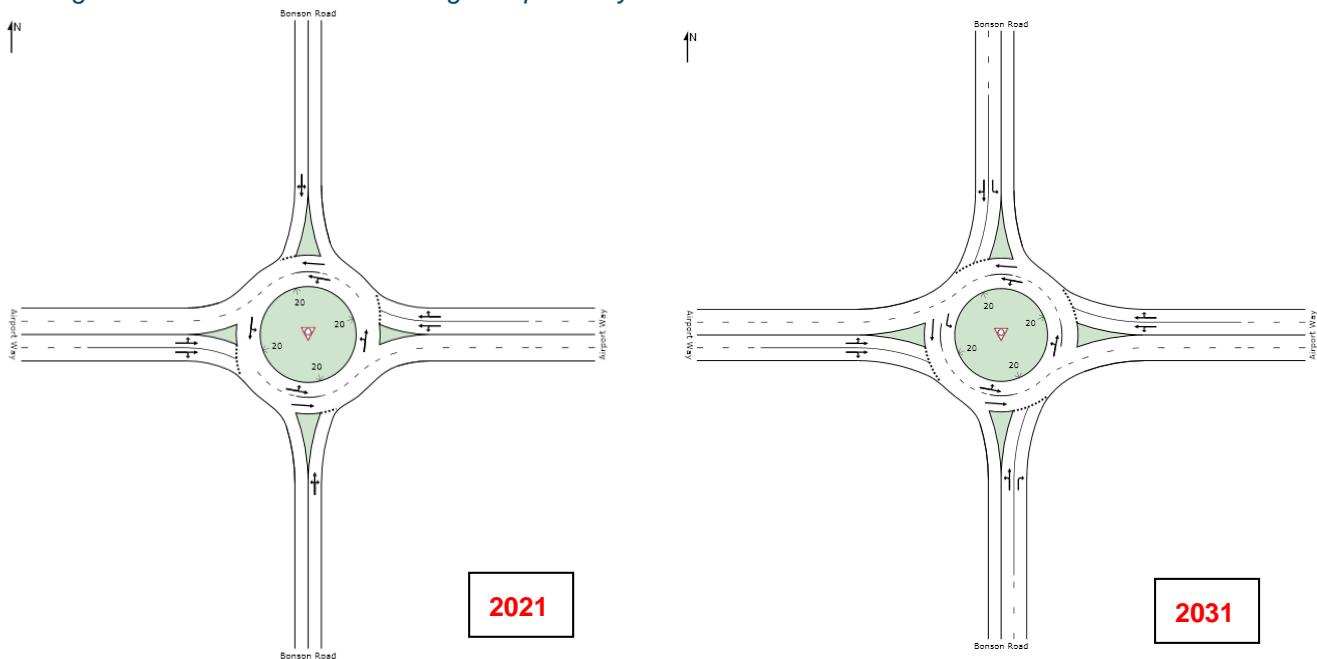
Mitigations

Similar to the Harris Road roundabout, two options were analyzed to mitigate the poor performance. Option 1 includes upgrade to a two-lane roundabout and Option 2 involves intersection signalization.

Option 1 - 2-Lane Roundabout

Four-laning of Airport Way will be required for the two-lane roundabout option. Sidra analysis results revealed that a 2-lane roundabout will handle the future 2021 traffic at acceptable LOS and queues. However, EB movement in 2031 PM peak will experience LOS F even with a 2 lane roundabout. The 2021 traffic was modelled with 2 approach lanes for EB and WB directions and a single approach lane for NB and SB directions as shown in **Figure 13**. The results for 2021 and 2031 combined scenarios with 2-lane roundabout are shown in **Table 10**. Similar to the Harris Road intersection, the two lane roundabout at Bonson Road will require some property acquisition. The exact property take can be determined based on the final roundabout design and 4-lane widening of the Airport Way.

Figure 13 Recommended Laning – Airport Way / Bonson Road Roundabout



Option 2 – Intersection Signalization

Synchro analysis results revealed that an intersection signal will also accommodate the 2021 and 2031 combined traffic at acceptable LOS. It is noted that in 2021 the signalized intersection will not require a four-lane cross-section along Airport Way; however, queue lengths are expected to be longer than with the 2-lane roundabout option. In 2031 the signalized intersection will require a 4-lane cross-section along Airport Way. The proposed laning in 2021 and 2031 is shown in **Figure 14**. The results are included in **Table 10**. The signalized intersection will also require some property acquisition but is expected to have a smaller footprint as compared to a roundabout. Furthermore, the signalized intersection will accommodate the pedestrian/bike movements in a more safe / controlled manner with help of pedestrian push buttons/phases as compared to a two-lane roundabout.

Signal warrant was conducted using TAC methodology and the results show that the signal is warranted based on the projected 2021 volumes. The results of Signal Warrant are included in **Appendix D**.

Figure 14 Option 2 Proposed Laning – Airport Way / Bonson Road

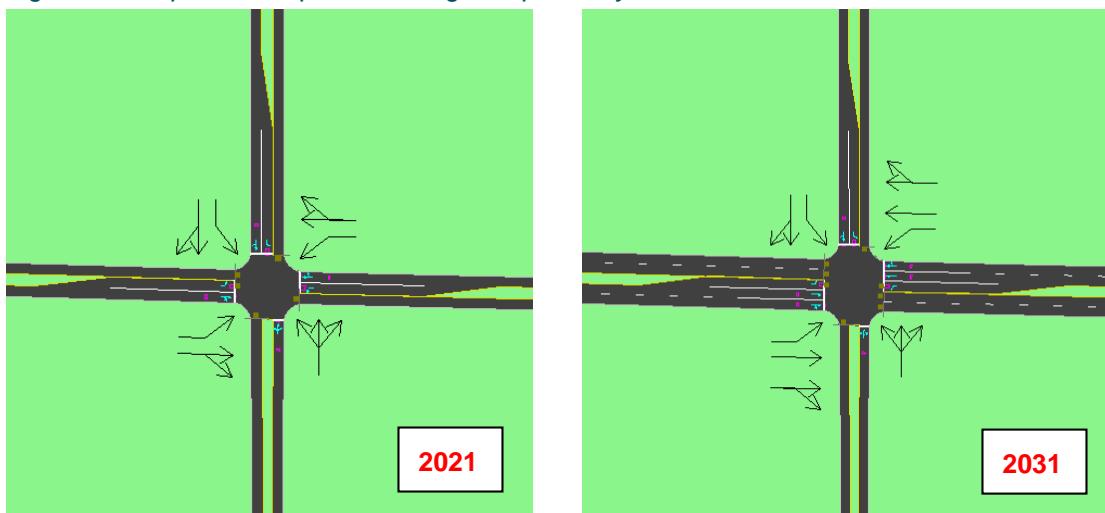


Table 10 Intersection Performance with Upgrades – Airport Way / Bonson Road

Mitigation Option	Scenario	Peak Period	MOE	Airport Way		Bonson Road	
				EB	WB	NB	SB
2-Lane Roundabout	2021 Combined (1-approach lane on Bonson Rd)	AM	LOS	A	B	B	E
			Delay	7.8	14.9	13.1	36.8
		PM	95% Queue	7.7	34.5	16.0	38.6
			LOS	E	B	C	B
	2031 Combined (2-approach lanes on Bonson Rd)	AM	Delay	37.2	16.5	23.4	10.5
			95% Queue	101	33.6	1.9	1.0
		PM	LOS	A	C	B	D
			Delay	8.4	22.9	10.6	33.7
Signal	2021 Combined (1-approach lane on Airport Way)	AM	95% Queue	7.8	51.7	9.3	31.8
			LOS	F	C	C	B
			Delay	109	21.8	22.6	10.9
		PM	95% Queue	439	40.5	10.5	8.3
			LOS	B	C	C	C
			Delay	12.6	34.0	25.5	28.7
	2031 Combined (2-approach lanes on Airport Way)	AM	95% Queue	43.6	#213	56.0	#47.8
			LOS	D	B	D	D
			Delay	47.9	17.4	37.1	36.3
			95% Queue	#296	88.6	47.2	30.8

Pedestrian Accommodation

The planned Sutton Avenue residential development is expected to generate additional pedestrian traffic at the intersection. A rough estimate of the number of future pedestrian crossings based on the ratio of the existing dwelling units to the future dwelling units showed that the north-south pedestrian crossings at the intersection will increase from 16 in the peak hour to about 28 in future. The planned elementary school may further increase pedestrian crossing demand at the intersection. The proposed signalized intersection option is expected to handle the future pedestrian crossing demand; however, a grade separated pedestrian overpass across Airport Way from Sutton Avenue development to the ball fields on the north side may be considered if Roundabout option is implemented.

Recommendation

Based on the better intersection performance results, safer pedestrian/ bike accommodations and lower property footprint, the signalized intersection option is recommended at this intersection.

4.2.3. Bonson Road / Hammond Road Intersection

This T-intersection is the only signalized intersection in the study area with the following laning:

- EB – 1 through / right turn lane
- WB – 1 left turn lane and 1 through / right turn lane
- NB – 1 left and 1 right turn lane

Synchro results are summarized in **Table 11**.

Table 11 Intersection Performance - Bonson Road / Hammond Road

Scenario	Peak Period	MOE	Hammond Road			Bonson Road	
			EBT	WBL	WBT	NBL	NBR
2016 existing	AM	LOS	C	B	B	B	A
		Delay	22.0	10.6	11.6	13.6	4.4
		95% Queue	58.0	11.2	33.3	33.9	7.0
	PM	LOS	D	B	B	B	A
		Delay	36.9	11.2	10.8	14.6	4.0
		95% Queue	109	12.7	38.1	23.7	8.6
2021 Background	AM	LOS	C	B	B	B	A
		Delay	26.0	10.8	11.2	15.0	4.3
		95% Queue	65.8	12.1	37.0	37.1	7.3
	PM	LOS	D	B	B	B	A
		Delay	44.1	11.8	11.0	14.9	4.0
		95% Queue	125	13.7	42.1	25.8	9.0
2031 Background	AM	LOS	C	B	B	B	A
		Delay	31.69	11.7	11.7	16.6	4.2
		95% Queue	66.6	#33.8	53.3	38.0	6.9
	PM	LOS	D	B	B	C	A
		Delay	36.3	14.0	10.2	20.6	4.9
		95% Queue	152	16.2	49.3	38.0	11.6
2021 Combined	AM	LOS	D	B	B	B	A
		Delay	38.8	19.0	10.7	16.9	4.0
		95% Queue	101	26.9	37.8	41.5	8.4
	PM	LOS	D	B	B	C	A
		Delay	37.9	16.0	10.1	20.2	4.3
		95% Queue	133	18.3	41.2	49.3	13.5
2031 Combined	AM	LOS	D	C	B	C	A
		Delay	49.5	29.2	10.1	24.7	4.7
		95% Queue	143	50	46	63	11
	PM	LOS	D	C	A	C	A
		Delay	45.9	32.9	9.7	32.2	6.7
		95% Queue	177	43	51.1	81.7	21.8

The results show that all movements are expected to operate at acceptable LOS for all background and combined traffic scenarios.

No capacity upgrades are recommended.

4.2.4. Bonson Road / 116A / 116B Avenue Intersection

The two closely spaced T-intersections are separated by about 50m. Each approach has a single lane. Synchro results for these two T-intersections are combined in **Table 12**.

All movements are expected to perform at acceptable LOS C or better except the EB left which operate at LOS E in 2031 AM combined scenario; however, the 95th percentile queue of 43 m (about 6 cars) remains manageable.

No capacity upgrades are recommended at this intersection.

Table 12 Intersection Performance - Bonson Road /116A / 116B Avenue

Scenario	Peak Period	MOE	116 a/b Avenue		Bonson Road			
			EB	WB	NBL	NBT	SBL	SBT
2016 existing	AM	LOS	B	B	A	A	A	A
		Delay	14.2	10.8	0.9	3.7	0.2	1.0
		95% Queue	9.5	2.3	2.6	2.6	0.5	0.5
	PM	LOS	B	B	A	A	A	A
		Delay	12.0	11.0	0.5	2.1	0.2	1.2
		95% Queue	3.5	1.5	1.3	1.3	0.6	0.6
2021 Background	AM	LOS	C	B	A	A	A	A
		Delay	15.8	11.1	1.0	3.8	0.2	1.0
		95% Queue	12.1	2.7	3.0	3.0	0.5	0.5
	PM	LOS	B	B	A	A	A	A
		Delay	12.6	11.4	0.5	2.2	0.3	1.3
		95% Queue	4.2	1.7	1.5	1.5	0.7	0.7
2031 Background	AM	LOS	C	B	A	A	A	A
		Delay	20.5	11.9	1.3	4.1	0.3	1.1
		95% Queue	19.7	3.6	3.7	3.7	0.7	0.7
	PM	LOS	B	B	A	A	A	A
		Delay	14.4	12.3	0.7	2.3	0.3	1.4
		95% Queue	6.1	2.3	1.8	1.8	0.9	0.9
2021 Combined	AM	LOS	C	B	A	A	A	A
		Delay	22.6	12.1	1.3	3.9	0.2	0.7
		95% Queue	18.9	3.1	3.5	3.5	0.6	0.6
	PM	LOS	C	B	A	A	A	A
		Delay	16.0	14.3	0.7	1.7	0.4	1.2
		95% Queue	6.1	2.5	1.6	1.6	0.9	0.9
2031 Combined	AM	LOS	E	B	A	A	A	A
		Delay	48.1	14.0	1.9	4.4	0.4	0.8
		95% Queue	43.0	4.6	4.8	4.8	0.7	0.7
	PM	LOS	C	C	A	A	A	A
		Delay	22.8	18.1	1.1	1.9	0.6	1.4
		95% Queue	11.2	4.1	2.0	2.0	1.2	1.2

4.2.5. Bonson Road / Sutton Avenue Intersection

This unsignalized T-intersection is currently operating with a single lane at each approach. The future residential development is planned to have two full access from Sutton Avenue and a right-in-right-out access at Airport Way. Therefore, the primary development access is at this intersection. Intersection performance is summarized in **Table 13**.

Table 13 Intersection Performance - Bonson Road / Sutton Avenue

Scenario	Peak Period	MOE	Sutton Avenue	Bonson Road	
			EBL/R	NB	SB
2016 existing	AM	LOS	B	A	A
		Delay	10.4	0.0	0.0
		95% Queue	1.2	0.0	0.0
	PM	LOS	B	A	A
		Delay	10.4	0.1	0.0
		95% Queue	0.5	0.0	0.0
2021 Background	AM	LOS	B	A	A
		Delay	10.6	0.0	0.0
		95% Queue	1.3	0.0	0.0
	PM	LOS	B	A	A
		Delay	10.7	0.1	0.0
		95% Queue	0.6	0.0	0.0
2031 Background	AM	LOS	B	A	A
		Delay	11.1	0.0	0.0
		95% Queue	1.7	0.0	0.0
	PM	LOS	B	A	A
		Delay	11.3	0.2	0.0
		95% Queue	0.8	0.1	0.0
2021 Combined	AM	LOS	B	A	A
		Delay	11.3	0.0	0.0
		95% Queue	4.2	0.0	0.0
	PM	LOS	B	A	A
		Delay	11.4	0.1	0.0
		95% Queue	2.0	0.0	0.0
2031 Combined	AM	LOS	B	A	A
		Delay	13.0	0.5	0.0
		95% Queue	7.6	0.2	0.0
	PM	LOS	B	A	A
		Delay	12.6	0.5	0.0
		95% Queue	4.0	0.2	0.0

Synchro results show that all movements at this intersection are expected to perform at acceptable LOS by 2031. No capacity upgrades are required.

Right-in-Right-out Access for 19451 Sutton Avenue Development at Airport Way

The right-in-right-out access was included in the Synchro model to analyze the 2021 and 2031 combined traffic scenarios. The Synchro results revealed that the access will perform with acceptable LOS and queue not exceeding two vehicles in the peak hours. To ensure right-in-right-out compliance, a channelized traffic island is recommended at the Airport Way access.

4.2.6. Airport Way / Southgate Road Intersection

This unsignalized T- intersection is operating with a single lane at each approach. Intersection performance is summarized in **Table 14**.

Table 14 Intersection Performance - Airport Way / Southgate Road

Scenario	Peak Period	MOE	Airport Way				Southgate Road	
			EBT	EBR	WBL	WBT	NBL	NBR
2016 existing	AM	LOS	A	A	A	A	B	B
		Delay	0.0	0.0	0.1	0.3	13.3	13.3
		95% Queue	0	0	0.2	0.2	2.8	2.8
	PM	LOS	A	A	A	A	B	B
		Delay	0.0	0.0	0.6	1.2	14.6	14.6
		95% Queue	0	0	1.1	1.1	1.7	1.7
2021 Background	AM	LOS	A	A	A	A	B	B
		Delay	0.0	0.0	0.1	0.3	14.1	14.1
		95% Queue	0.0	0.0	0.3	0.3	3.4	3.4
	PM	LOS	A	A	A	A	C	C
		Delay	0.0	0.0	0.8	1.4	16.1	16.1
		95% Queue	0.0	0.0	1.3	1.3	2.2	2.2
2031 Background	AM	LOS	A	A	A	A	C	C
		Delay	0.0	0.0	0.2	0.4	16.6	16.6
		95% Queue	0.0	0.0	0.3	0.3	5.2	5.2
	PM	LOS	A	A	A	A	C	C
		Delay	0.0	0.0	1.1	1.7	19.8	19.8
		95% Queue	0.0	0.0	1.7	1.7	3.3	3.3
2021 Combined	AM	LOS	A	A	A	A	C	C
		Delay	0.0	0.0	0.3	0.4	24.9	24.9
		95% Queue	0.0	0.0	0.3	0.3	7.3	7.3
	PM	LOS	A	A	A	A	F	F
		Delay	0.0	0.0	2.8	3.3	58.8	58.8
		95% Queue	0.0	0.0	2.7	2.7	9.5	9.5
2031 Combined	AM	LOS	A	A	A	A	E	E
		Delay	0.0	0.0	0.6	0.7	49.3	49.3
		95% Queue	0.0	0.0	0.4	0.4	17.1	17.1
	PM	LOS	A	A	A	A	F	F
		Delay	0.0	0.0	8.5	8.9	253.4	253.4
		95% Queue	0.0	0.0	4.8	4.8	25.9	25.9

Synchro results show that the intersection performance will remain acceptable for all background scenarios. During the combined traffic conditions, the stop controlled NB movement will experience LOS E/F; however, the queues are expected to remain manageable (26 m, about four vehicles).

Mitigations

Based on the results no capacity upgrades are recommended at this intersection. However, this intersection may be considered for a signalized pedestrian crossing as the planned developments along Airport Way are

constructed and a significant increase in traffic is expected. In addition, an existing multiuse pathway from the north ties in at Airport Road, and a Zebra crossing is provided. The pedestrian signal (subject to meeting the warrant) may become inevitable if Airport Way is widened to 4 lane cross-section.

4.2.7. Harris Road / Fieldstone Walk Intersection

This unsignalized T-intersection serves the residential development along Fieldstone Walk and has very low traffic volumes in and out of the development. The intersection performance is summarized in **Table 15**.

The results show that all movements at the intersection are expected to perform at LOS D or better for all background and combined traffic scenarios. No upgrades are recommended.

Mitigations

Based on the results no capacity upgrades are recommended at this intersection. However, this intersection may be considered for a signalized pedestrian crossing (subject to meeting the pedestrian crossing control warrant) as the planned developments along Airport Way are constructed and a significant increase in traffic is expected on Harris Road.

Table 15 Intersection Performance - Harris Road / Fieldstone Walk

Scenario	Peak Period	MOE	Fieldstone Walk	Harris Road	
			EBL/R	NB	SB
2016 existing	AM	LOS	A	A	A
		Delay	9.8	0.0	0.1
		95% Queue	0.2	0.0	0.1
	PM	LOS	B	A	A
		Delay	11.5	0.0	0.2
		95% Queue	0.3	0.0	0.1
2021 Background	AM	LOS	A	A	A
		Delay	10.0	0.0	0.1
		95% Queue	0.2	0.0	0.1
	PM	LOS	B	A	A
		Delay	12.2	0.0	0.3
		95% Queue	0.5	0.0	0.1
2031 Background	AM	LOS	B	A	A
		Delay	10.5	0.0	0.2
		95% Queue	0.3	0.0	0.1
	PM	LOS	B	A	A
		Delay	13.2	0.0	0.3
		95% Queue	0.7	0.0	0.2
2021 Combined	AM	LOS	B	A	A
		Delay	12.2	0.0	0.1
		95% Queue	0.3	0.0	0.1
	PM	LOS	C	A	A
		Delay	20.1	0.0	0.2
		95% Queue	1.0	0.0	0.2
2031 Combined	AM	LOS	B	A	A
		Delay	14.6	0.0	0.1
		95% Queue	0.5	0.0	0.1
	PM	LOS	D	A	A
		Delay	28.1	0.0	0.3
		95% Queue	1.8	0.0	0.3

4.3. Existing Airport Way / Bonson Road Roundabout Operational and Safety Review

A site visit of the Bonson Road / Airport Road roundabout was conducted on Wednesday, January 27, 2016, during the after school period (3-4 pm) to observe safety and operational performance, particularly related to sight distance, pedestrian movements and traffic conflicts. The following observations were noted:

- Sight distance on the Airport Way at the west approach to the roundabout appears to be limited by an embankment in the northwest quadrant. Heavy vehicles approaching eastbound on Airport Way were observed to hesitate, begin to accelerate and then suddenly brake near the yield line as they saw an approaching vehicle from the north. A further analysis of sight distance needs is provided below.
- Numerous students were observed to cross the roundabout and no unusual conflicts were noted between pedestrians and vehicles.
- The absence of a narrow boulevard separation between the curb and concrete sidewalk may lead to conflicts between pedestrians and the overhang portion of large vehicles in the circulating lane of the roundabout.
- Approaching cyclists on Airport Way are directed to a 1.5m concrete sidewalk. Normally, a shared pedestrian/cyclist sidewalk is a minimum of 2.5m – 3.0m wide. If the desire is to direct cyclist to the travel lane, and ride through the roundabout, shared road pavement markings and “Share the Road” signs should be installed.
- A drainage issue exists on the westbound Airport Way bike lane approach to the sidewalk ramp, as ponding was observed in this area (see **Photo 1**).

Photo 1 Ponding in Westbound Bike Lane



Sight Distance Requirements

NCHRP Report #672, Roundabouts: An Informational Guide, provides guidance on sight distance at roundabouts. Intersection sight distance triangles can be measured on each leg based on approach speeds of the upstream entry. It should be noted that NCHRP #672 states, "Providing more than the minimum required intersection sight distance can lead to higher speeds that reduce intersection safety." Assuming approach speeds of 30 km/h, **Figure 9** shows the required sight triangles for each leg at the roundabout.

The south leg currently has no sight distance restriction, but this should be considered when the property in the southwest quadrant develops. The north and east leg approaches may have a slight sight distance deficiency, which can be easily rectified with landscape maintenance.

Photo 2 shows the available sight distance from the west leg to the upstream approach.

The available sight distance on the west leg appears to be very close to the minimum requirement. Sight distance may benefit from relocating the existing porta-potty to a different location.

Figure 15 Sight Triangle Requirements at Bonson Road / Airport Way

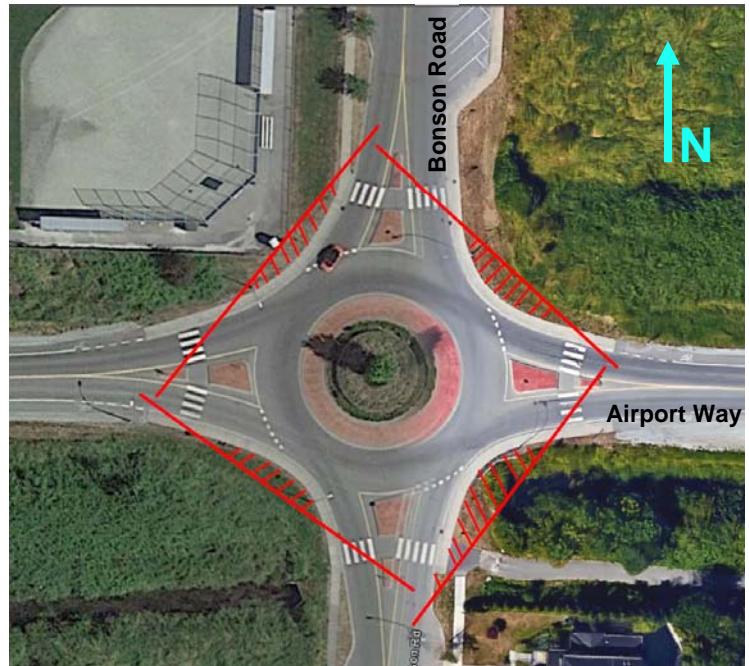


Photo 2 West Leg Sight Distance to Upstream Approach



5. Transit, Pedestrian and Bicycle Access

A site visit was conducted to document pedestrian / bike facilities and connectivity in the study area. Pedestrian movements were observed and existing transit and pedestrian / bicycle facilities, such as sidewalks, cross walks, bike lanes etc. were documented.

5.1. Transit

Bus route C41 Meadowtown / Maple Meadows station is the only route serving the South Bonson community. The route has 30 minute headways during the week and 60 minutes on weekends and is shown in **Figure 16**.

There are some options that may help encourage ridership in the South Bonson Area:

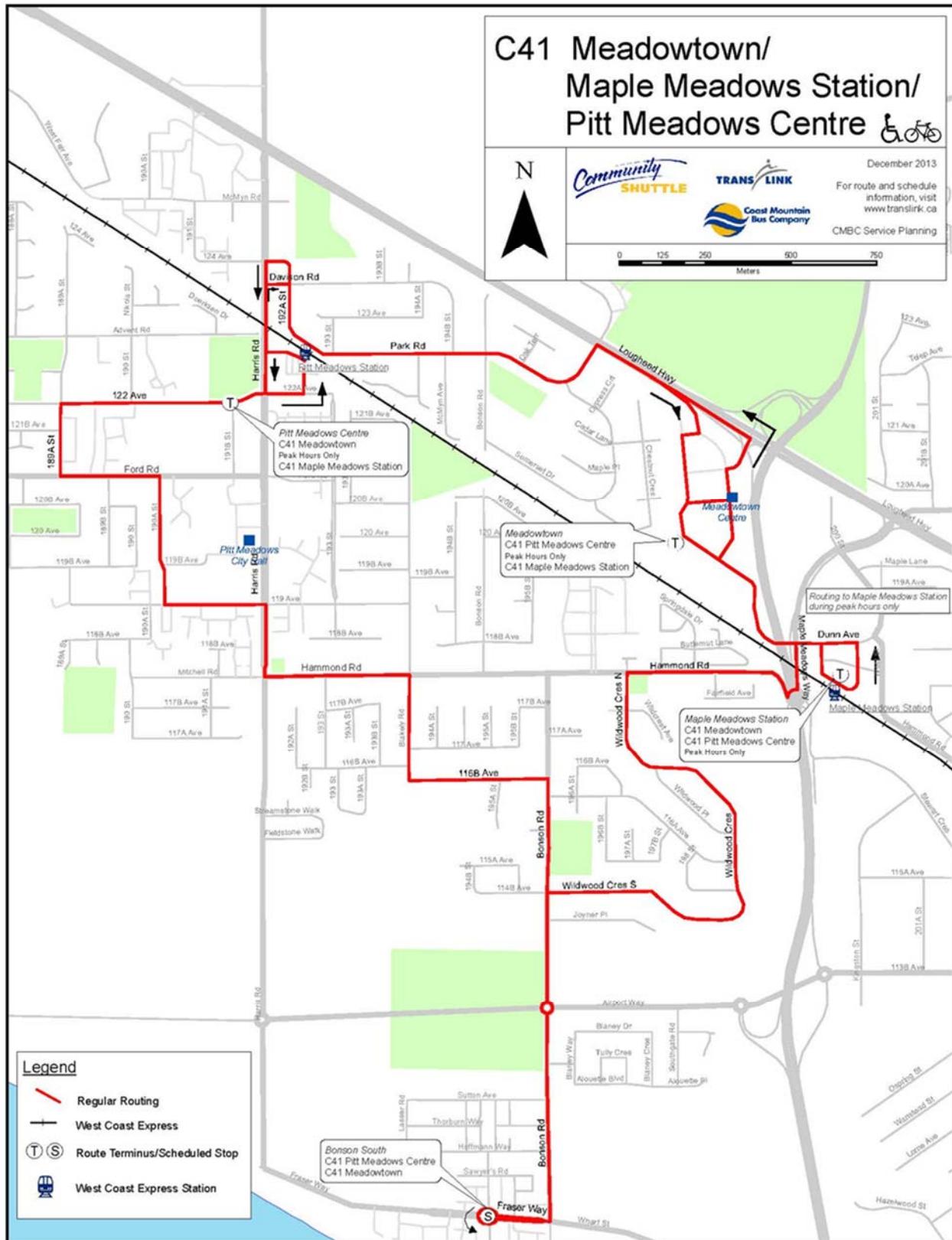
- The addition of bus shelters at existing (and potential future) stops
- Clearly defined paths/sidewalks to all bus stops
- More frequent service

It is recommended that as the population grows and South Bonson Area develops, the City should work with TransLink to determine if an additional bus route, more frequent bus service, or extension of the current route to better serve the South Bonson Area.

5.1.1. Bus Shelters

As Bonson Road serves the only bus route in the South Bonson area, there are bus stops located along the Bonson Road corridor. The presence of the Pitt Meadows Athletic Park, Pitt Meadows Secondary School and the future elementary school along Bonson road will continue to contribute to increased transit ridership and enhanced facilities for the transit users. Based on the current and future transit demand, two bus shelters on either side of Bonson Road at the Athletic Park access are recommended to be installed. The locations of proposed bus stops are shown in **Figure 17**.

Figure 16 Route Map – TransLink Route C41 – Meadowtown /Maple Meadows Station



5.2. Sidewalks

At present, sidewalks are installed along the following locations in the study area:

- Bonson Road
 - West sidewalk - between Fraser Way and Hammond Road;
 - East sidewalk - between Airport Way and Hammond Road.
- Harris Road
 - West sidewalk - between Fraser Way and Airport Way.

The City of Pitt Meadows Pedestrian and Bicycle Master Plan shows the following proposed sidewalk/pathways upgrades in the future:

- Proposed sidewalk on both sides of Harris Road between Fraser Way and Fieldstone Walk;
- Proposed sidewalk on Sutton Avenue;
- Proposed sidewalk on Bonson Road east side from Fraser Way to Sutton Avenue;
- Proposed off-street pathway along Airport Way between Baynes Road and Bonson Road; and
- Proposed off-street pathway along Harris Road between Fraser Way and Hammond Road.

The City's *Subdivision and Development Servicing Bylaw* requires that sidewalks be provided on both sides of collector and arterial roads, and on local roads with higher density residential and commercial developments.

Excerpts from the *Pedestrian and Cycling Master Plan* are included in [Appendix A](#).

5.3. Bike Lanes

At present, bike lanes are installed along the following locations in the study area:

- Airport Way
 - Bike lanes are marked along both sides of Airport Way between Southgate Road and Baynes Road.
- Harris Road
 - Bike lanes are marked along both sides of Harris Road between Airport Way and Fieldstone Walk.

It is noted that there is currently a multi-use pathway north of Airport Way / Southgate Road intersection. The *City of Pitt Meadows Pedestrian and Bicycle Master Plan* shows a proposed bike lane on Bonson Road from Fraser Way to Hammond Road.

In order to ensure that the sidewalk and bike lane network in South Bonson community is complete and facilitates continuous connections to GEBP, Athletic Park, and Pitt Meadows Secondary School and safe pedestrian flow, the proposed upgrades, described above, are recommended to be implemented as the developments are constructed in the study area. In addition, considering the expected future increase in pedestrian activity due to residential development and Elementary school, a crosswalk is recommended across Bonson Road at the Athletic Park entrance. This crosswalk is considered important for pedestrian / bike flow connecting the multiuse pathway across the Bonson Road.

All existing and proposed pedestrian facilities are shown in [Figure 17](#).



SOUTH BONSON TRAFFIC STUDY
FIGURE 17 - RECOMMENDED IMPROVEMENTS

6. Recommended Upgrades and Cost Estimates

All upgrades recommended based on the analysis in previous sections, shown on [Figure 17](#), have been costed using high level Wolski Cost Estimating Methodology. [Table 16](#) summarizes the upgrades with cost estimates. Wolski cost estimate summary is included in [Appendix E](#).

Table 16 Summary of Recommended Upgrades with Costs

Location	Upgrade Description	Cost estimate	Comments
Airport Way between Baynes Road and Golden Ears Way	<ul style="list-style-type: none"> Four Lane widening 	\$4,268,505	Widening to be completed by 2021
Airport Way / Harris Road Intersection	<ul style="list-style-type: none"> Option 1 - Conversion from one lane to two lane roundabout Option 2 - Intersection Signalization 	\$1,318,937 \$1,614,720	2 approach lanes in all four directions and 1 receiving lane along Harris Road exits 4-lane widening not required by 2021 for signal option. Cost estimate shown for 2031 configuration.
Airport Way / Bonson Road Intersection	<ul style="list-style-type: none"> Option 1 - Conversion from one lane to two lane roundabout Option 2 - Intersection Signalization 	\$1,154,156 \$1,449,940	By 2021, 2 approach lanes along Airport Way and a 1 approach lane for NB and SB directions. By 2031, 2 approach lanes in all four directions. Cost estimate shown for 2031 configuration. 4-lane widening not required by 2021 for signal option
Airport Way / Southgate Road Intersection	Pedestrian Crossing as the traffic is significantly increased due to future planned developments.	\$175,000	Installation subject to meeting pedestrian signal warrant
Harris Road / fieldstone Walk Intersection	Signalized crosswalk as the traffic is significantly increased due to future planned developments	\$175,000	Installation subject to meeting pedestrian signal warrant
Bonson Road @ Athletic Park Entrance	Marked Pedestrian crosswalk	\$15,000	
Sidewalks	<ul style="list-style-type: none"> Harris Road – east side between Fraser Way and Airport Way Harris Road – both east and west side between Airport Way and Fieldstone Walk Sutton Avenue - North side between Lasser Road to Bonson Road 	\$126,254 \$216,568 \$126,254	
Bike lanes	<ul style="list-style-type: none"> Bonson Road – between Sutton Avenue to Hammond Road Harris Road – between Fraser Way and Airport Way 	\$16,886 \$9,698	On street painted bike lanes using existing pavement structure. No lane widening is assumed. Cost includes paint lines and signing.
Bus Shelters	Two bus shelters on Bonson Road (Figure 17)	\$80,000	
Total with Option 1		\$7,682,258	
Total with Option 2		\$8,273,825	

7. Closure

The information provided in this report is true and accurate to the best of our knowledge. Please call the undersigned if you have any questions regarding any aspect of this study.

Sincerely,

McELHANNEY CONSULTING SERVICES LTD.

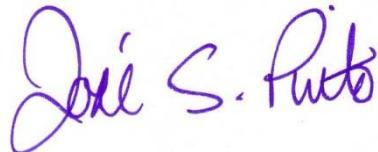
Prepared by:



Ahmad Puri, PEng, MEng, Traffic Engineer
Traffic & Transportation Planning

email: apuri@mcelhanney.com

Reviewed by:



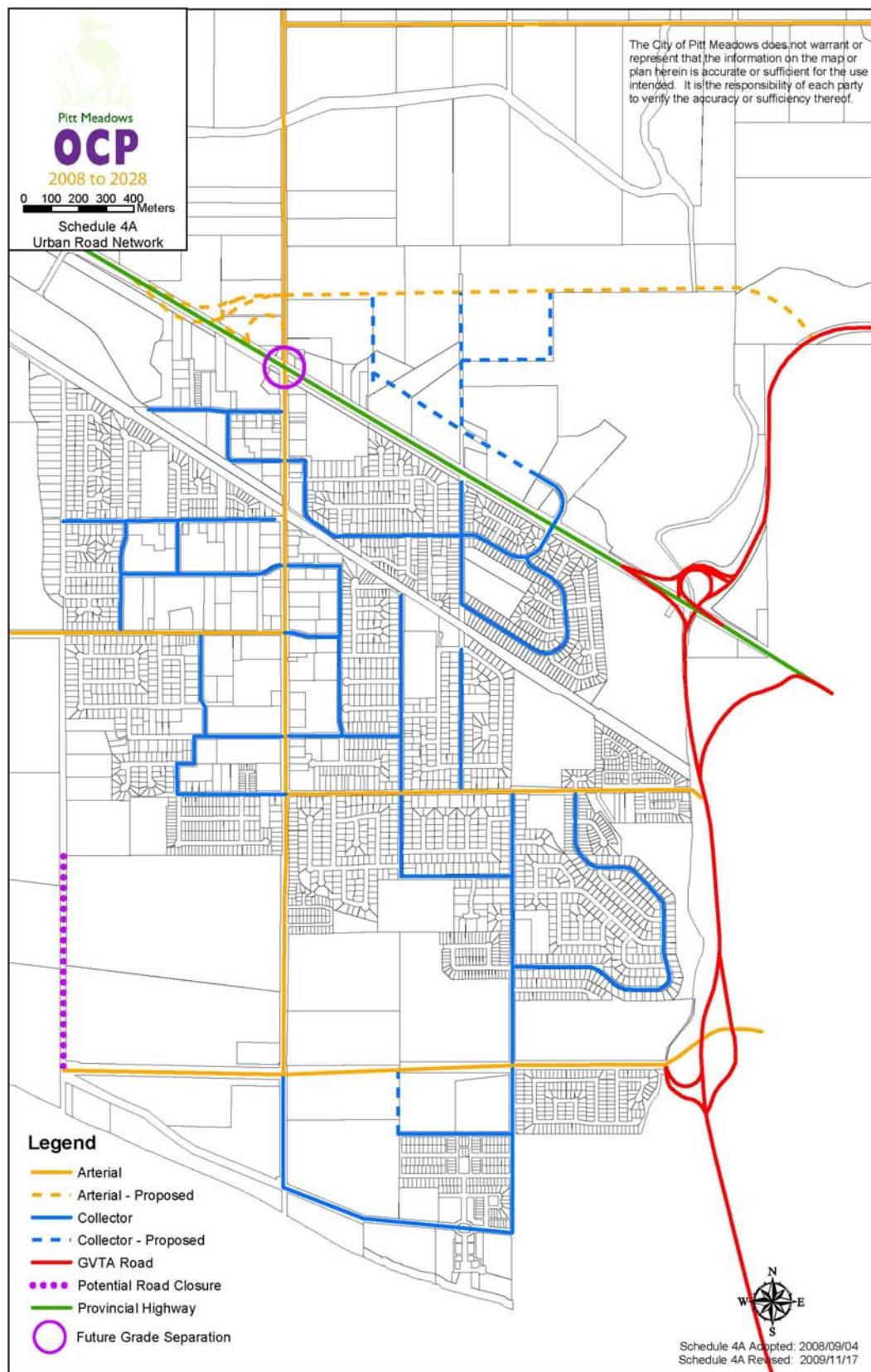
Jose Pinto, PEng, PTOE, Division Manager
Traffic & Transportation Planning

email: jpinto@mcelhanney.com

cc: Forrest Smith, City of Pitt Meadows
 Katia Robichaud, City of Pitt Meadows
 Borg Chan, ISL Engineering

Appendix A - Excerpts – City of Pitt Meadows Office Community Plan / Pedestrian and Cycling Master Plan

CITY OF PITT MEADOWS OFFICIAL COMMUNITY PLAN



(Bylaw No. 2432, 2009)



Figure 3:

Proposed sidewalk improvements to increase coverage on urban arterial, collector, and local roads.

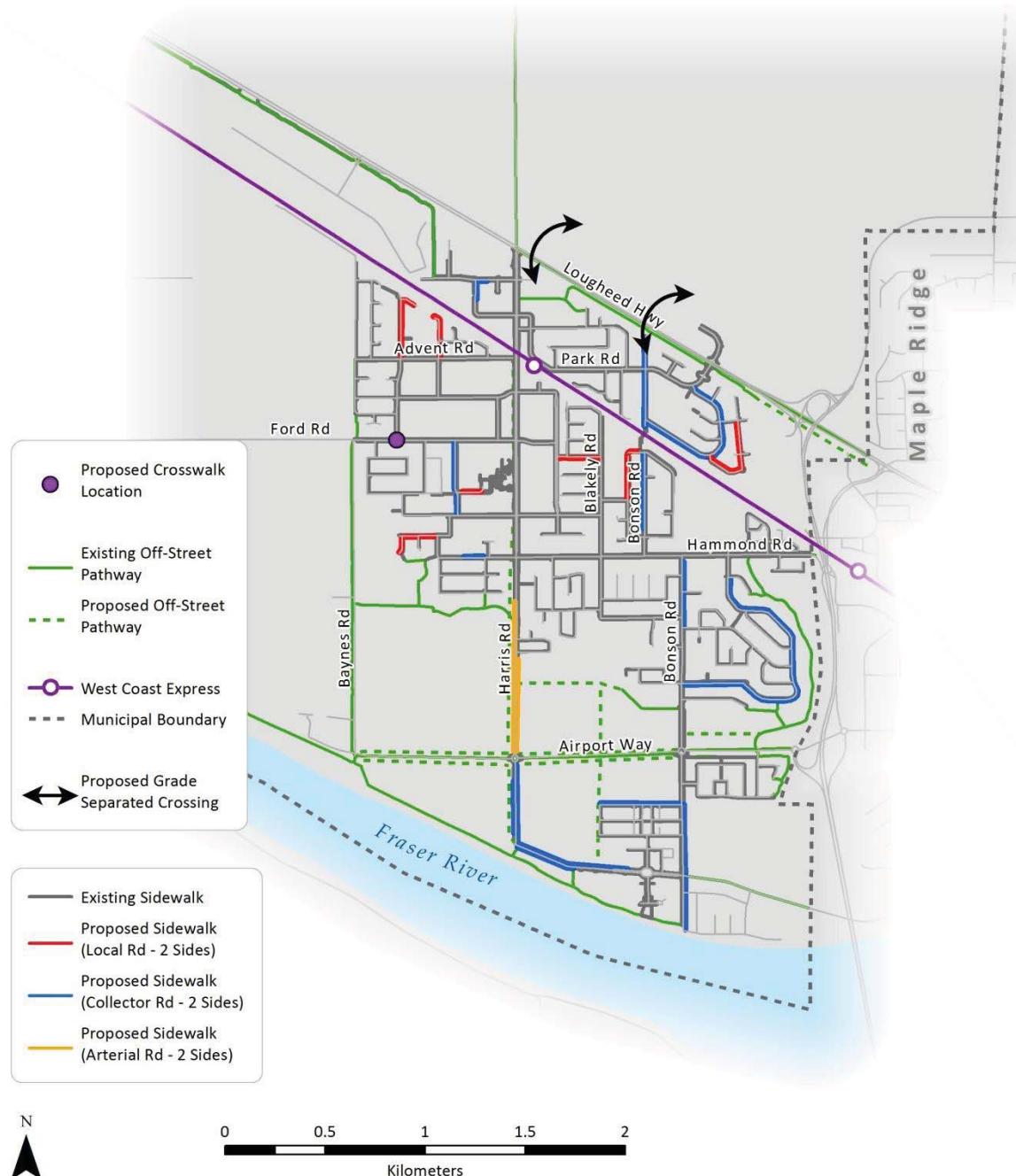
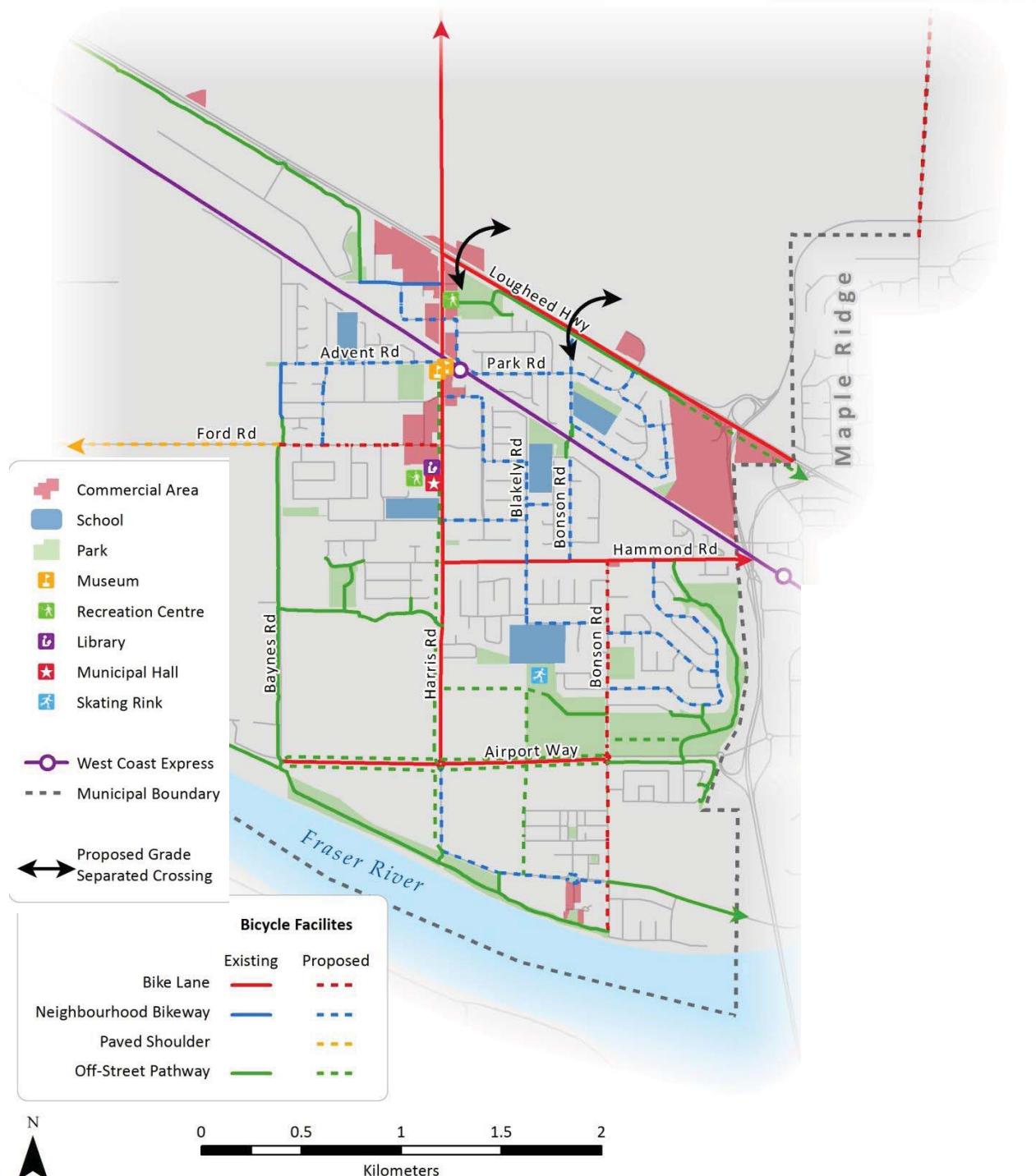




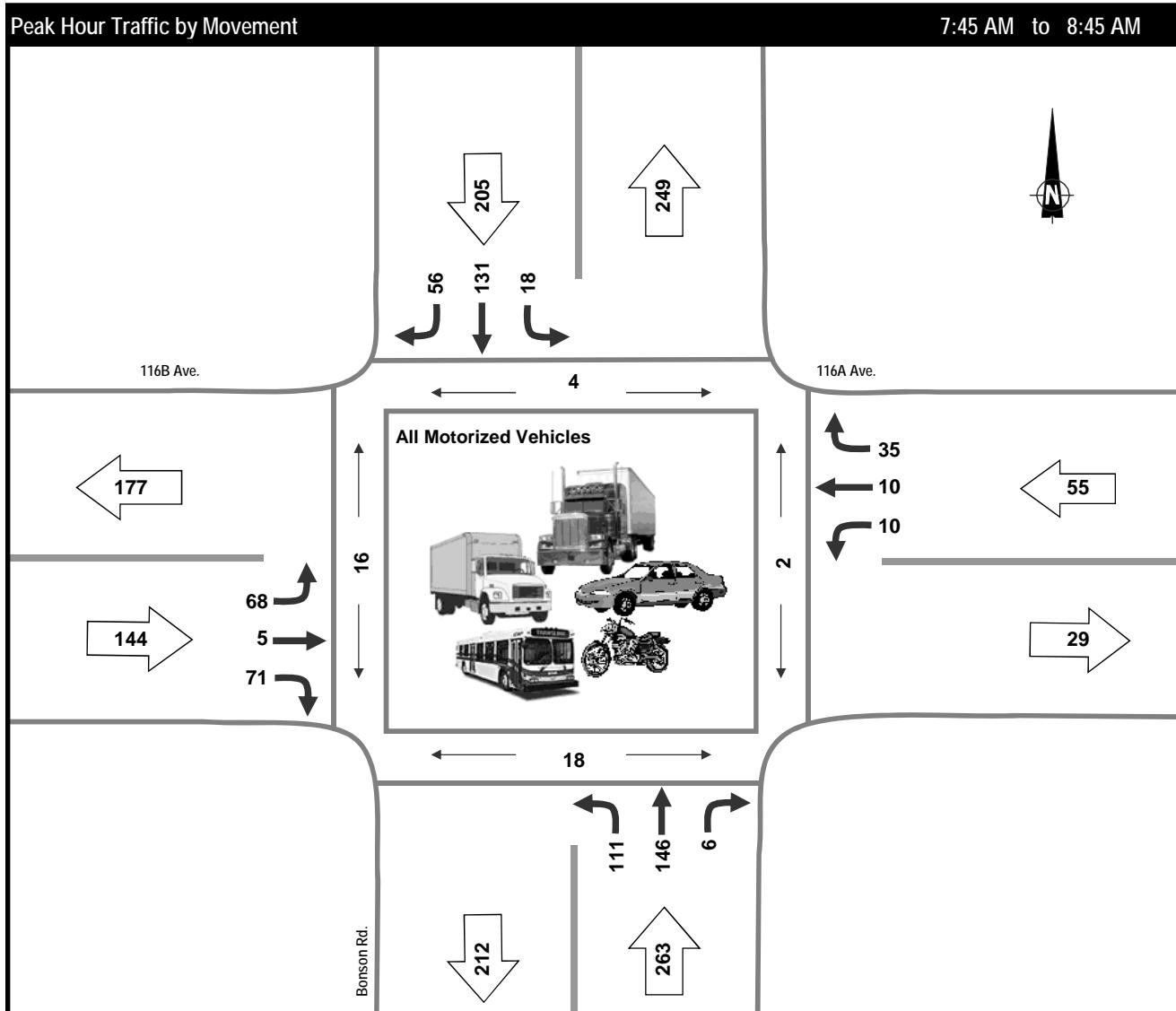
Figure 6
Existing and Proposed Bicycle Network (Urban Core)



Appendix B

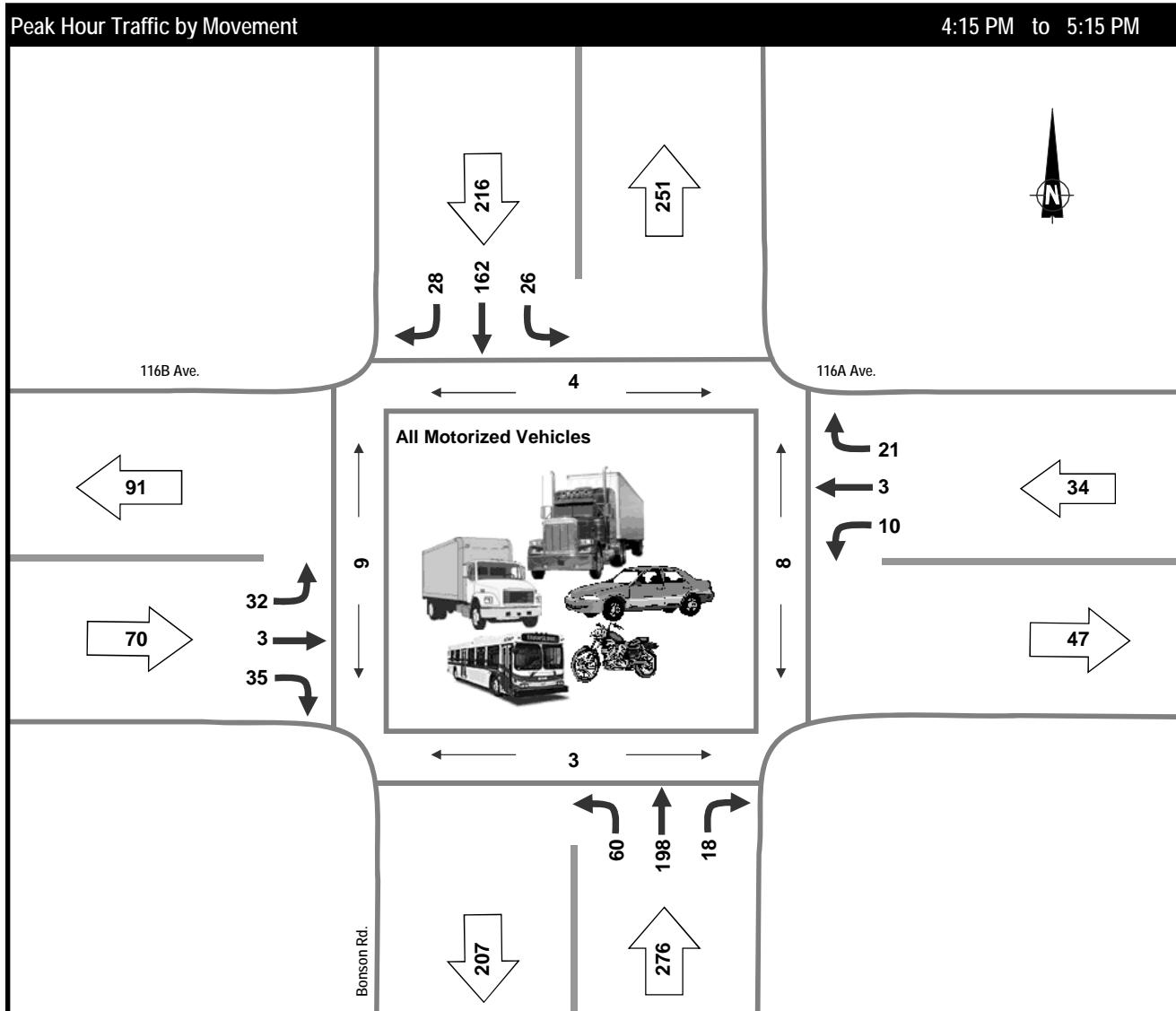
Detailed Traffic Counts

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles
Notes: Offset Intersection

Morning Peak Period


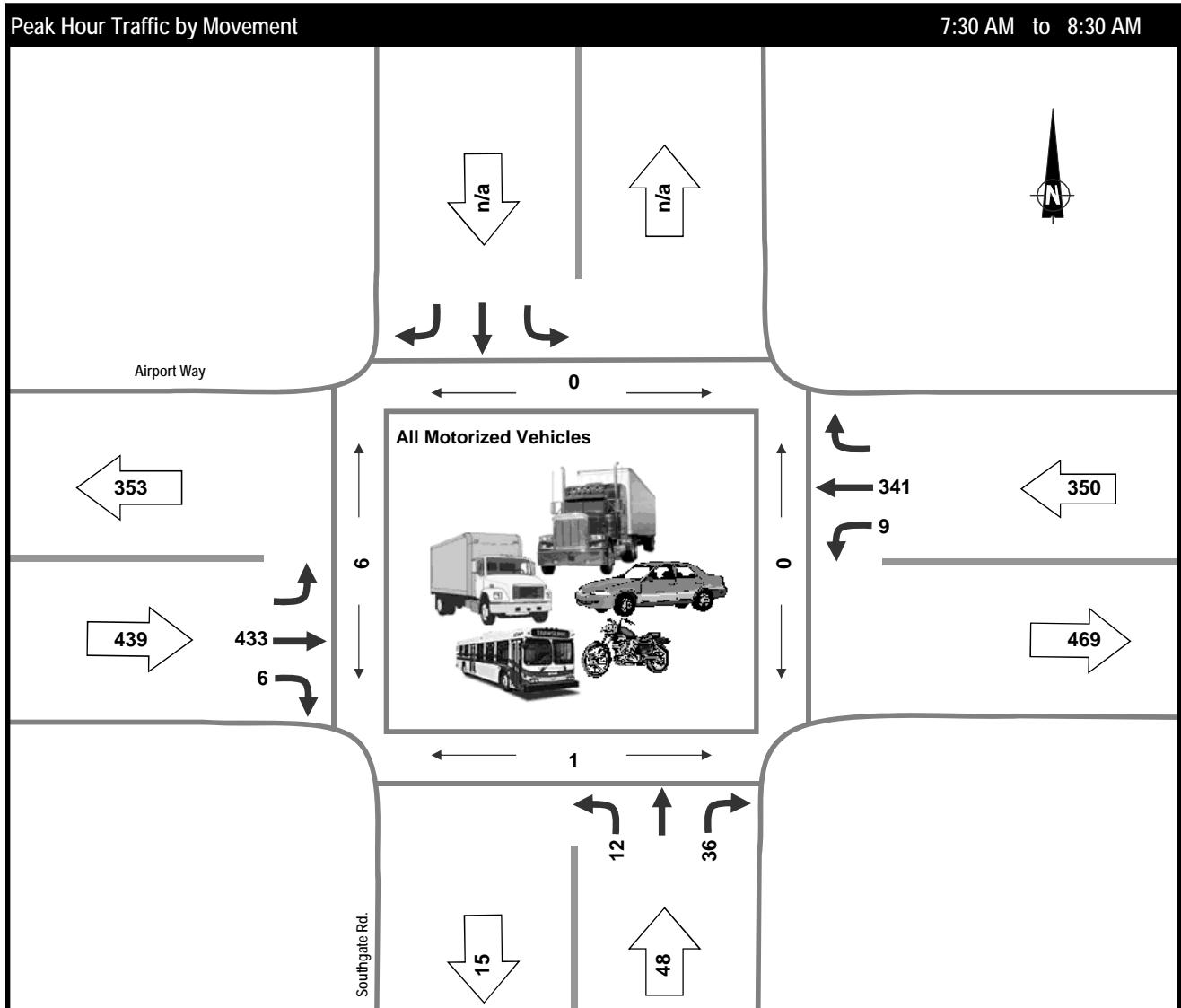
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	18	131	56	111	146	6	68	5	71	10	35	4	18	16	2	667	
PH Factor	0.50	0.66	0.54	0.46	0.61	0.38	0.47	0.31	0.68	0.63	0.55	0.33	0.41	0.50	0.50	0.62	
Peak 15 X 4	36	200	104	240	240	16	144	16	104	16	64	12	44	32	4	1,072	
Average Hour	12	110	32	64	118	5	40	4	49	9	30	3	10	9	2	480	
Survey Total	24	219	63	128	235	9	79	7	97	17	60	5	19	17	3	951	
7:00	0	20	1	3	23	0	3	0	5	0	1	4	0	0	0	60	
7:15	2	26	1	7	27	1	2	1	8	2	1	10	0	0	0	88	
7:30	0	20	3	4	25	1	2	0	7	4	0	5	0	1	1	71	
7:45	3	27	6	9	24	4	5	0	12	3	1	6	0	2	1	100	
8:00	2	23	20	35	40	1	12	1	26	4	4	9	1	5	3	177	
8:15	4	31	26	60	60	0	36	4	23	3	5	16	3	11	4	268	
8:30	9	50	4	7	22	1	15	0	10	0	0	4	0	0	8	122	
8:45	4	22	2	3	14	1	4	1	6	1	1	6	1	0	0	65	

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles
Notes: Offset Intersection

Afternoon Peak Period


Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	26	162	28	60	198	18	32	3	35	10	3	21	4	3	9	8	596
PH Factor	0.81	0.84	0.88	0.56	0.87	0.64	0.89	0.38	0.73	0.63	0.75	0.75	0.33	0.38	0.45	0.67	0.92
Peak 15 X 4	32	192	32	108	228	28	36	8	48	16	4	28	12	8	20	12	648
Average Hour	31	151	27	54	151	16	34	3	31	7	2	18	7	17	19	6	525
Survey Total	108	528	96	188	529	55	120	12	108	23	6	63	25	58	66	20	1,836
14:30	12	52	11	21	23	4	14	0	6	0	0	6	4	4	11	2	149
14:45	6	52	6	15	25	3	35	4	22	0	1	2	8	25	19	1	171
15:00	11	34	7	6	29	5	7	0	10	1	1	4	3	7	8	0	115
15:15	5	26	4	3	26	3	3	1	4	2	0	6	3	3	6	1	83
15:30	4	33	4	7	32	2	4	0	2	0	0	6	1	3	2	0	94
15:45	5	39	6	6	26	3	5	0	8	1	0	7	0	9	0	1	106
16:00	8	25	5	17	37	7	3	1	3	4	0	4	1	0	1	1	114
16:15	6	38	6	9	55	4	5	0	4	4	1	6	3	0	1	2	138
16:30	8	33	7	13	57	7	9	0	8	3	0	4	1	0	1	2	149
16:45	8	43	7	27	44	4	9	2	12	1	1	4	0	1	2	3	162
17:00	4	48	8	11	42	3	9	1	11	2	1	7	0	2	5	1	147
17:15	11	39	9	15	42	3	5	1	4	1	1	1	0	1	3	4	132
17:30	13	35	5	17	53	4	5	1	3	1	0	3	1	3	3	2	140
17:45	7	31	11	21	38	3	7	1	11	3	0	3	0	0	4	0	136

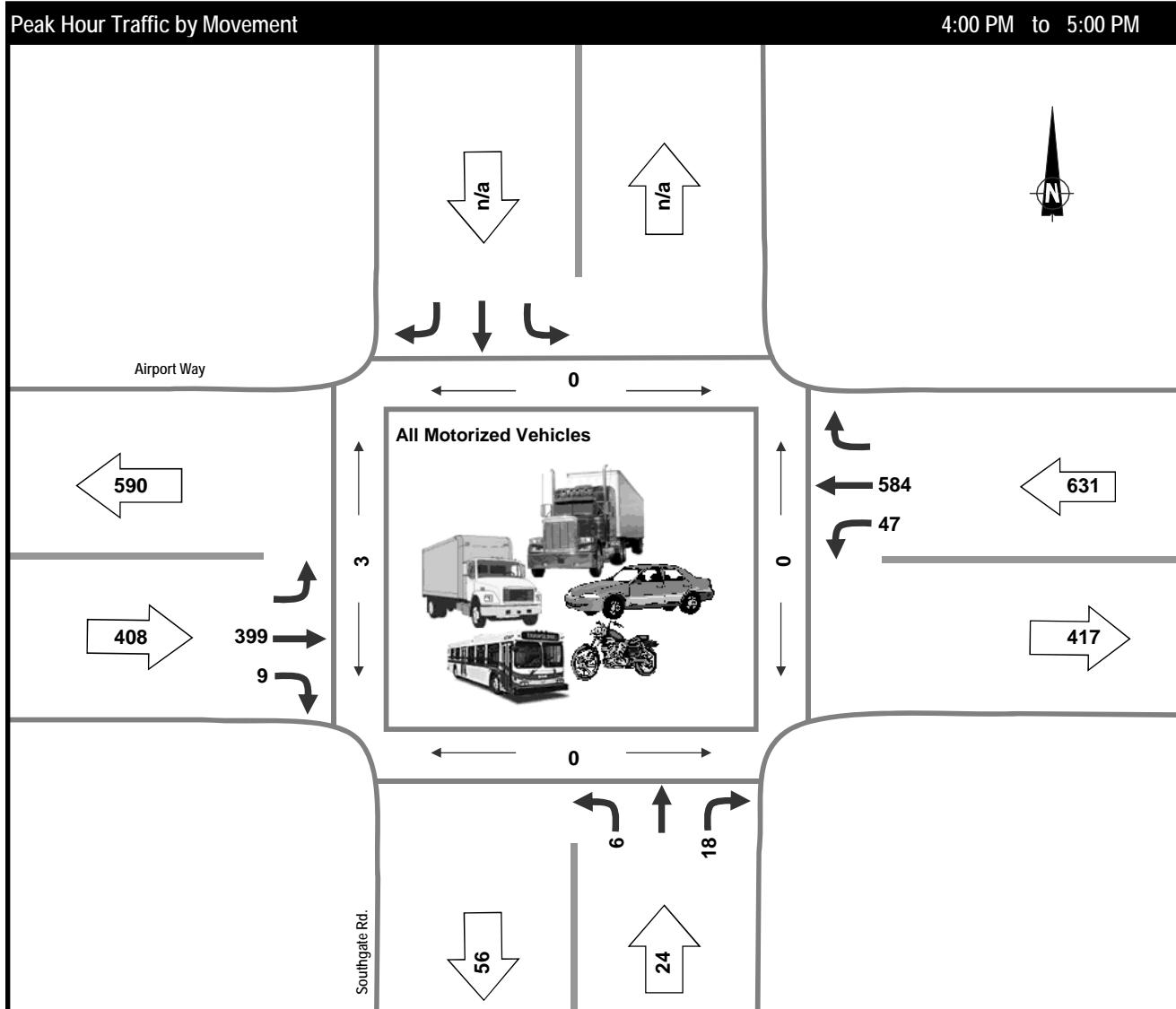
Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles

Morning Peak Period


Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour				12	36	0	433	6	0	9	341	0	0	1	6	0	837
PH Factor				0.38		0.69		0.91	0.38	0.75	0.89		0.00	0.25	0.50	0.00	0.93
Peak 15 X 4				32		52		476	16	12	384		0	4	12	0	896
Average Hour				8		33		398	4	9	302		1	1	7	0	754
Survey Total				15		66		795	7	17	604		2	2	13	0	1,504
7:00				1		12		83	0	1	43		0	0	0	0	140
7:15				2		6		114	0	1	68		0	1	3	0	191
7:30				1		5		119	0	2	76		0	0	2	0	203
7:45				0		10		94	1	2	96		0	1	0	0	203
8:00				3		13		109	1	2	79		0	0	1	0	207
8:15				8		8		111	4	3	90		0	0	3	0	224
8:30				0		5		103	1	3	89		0	0	1	0	201
8:45				0		7		62	0	3	63		2	0	3	0	135

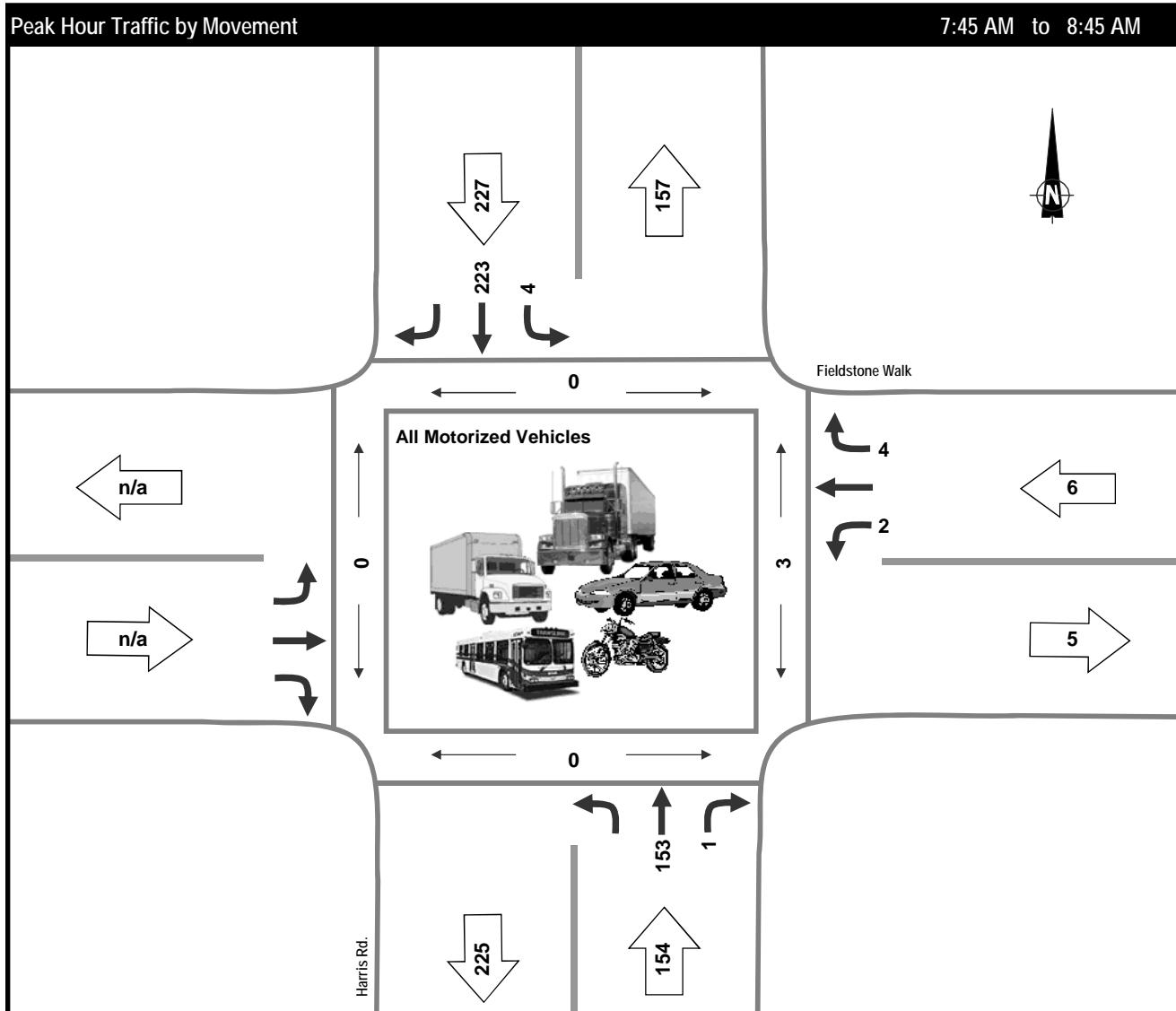
Afternoon Peak Period

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles



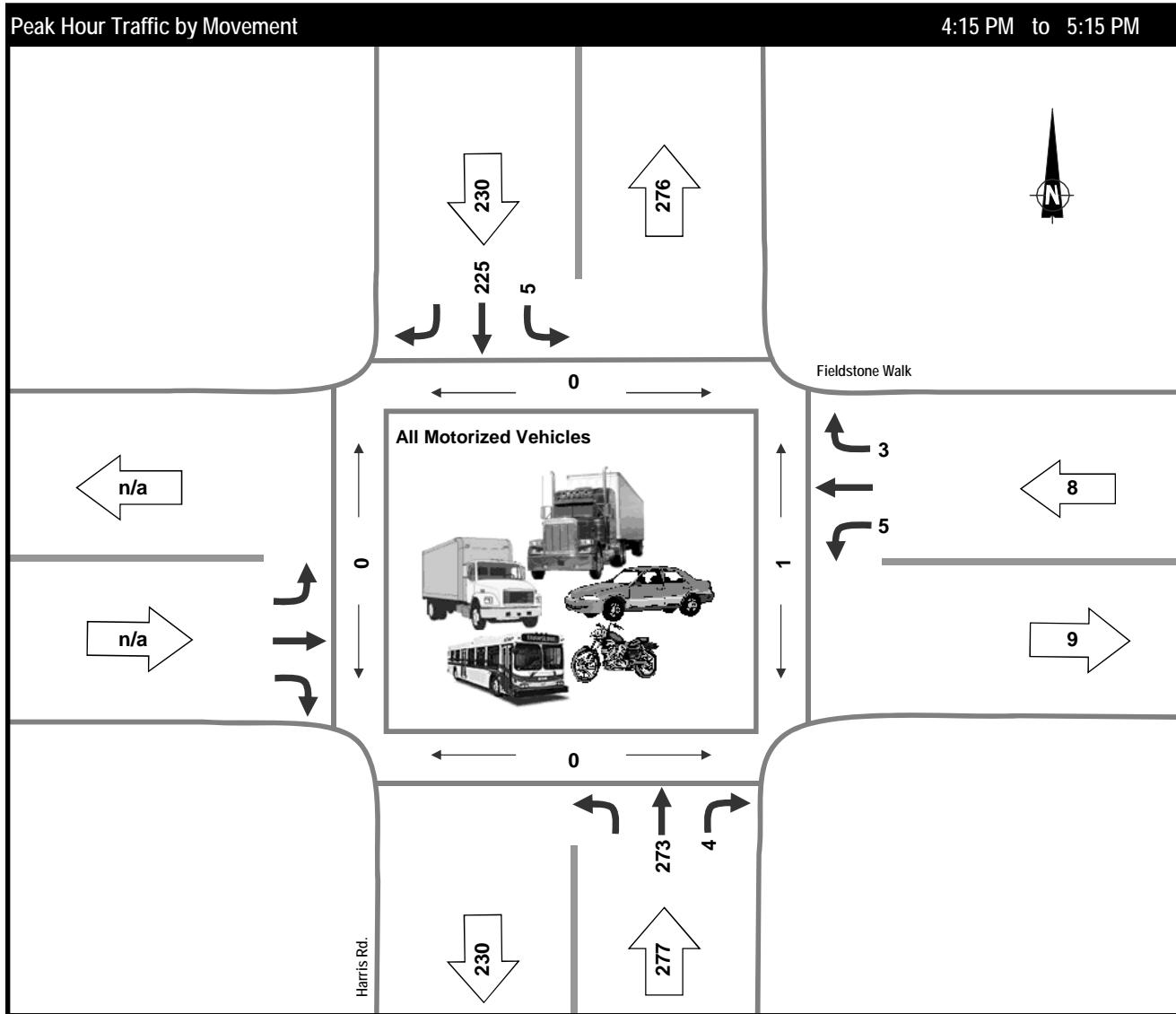
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour				6	18		399	9	47	584			0	0	3	0	1,063
PH Factor				0.50		0.75		0.88	0.75	0.65	0.80		0.00	0.00	0.38	0.00	0.91
Peak 15 X 4				12		24		452	12	72	728		0	0	8	0	1,164
Average Hour				6		18		356	13	38	461		1	1	3	0	892
Survey Total				20		63		1,245	46	132	1,615		3	2	12	0	3,121
14:30				2		0		63	6	11	81		0	1	0	0	163
14:45				0		6		78	4	4	97		2	0	2	0	189
15:00				2		4		81	4	8	102		0	0	2	0	201
15:15				2		4		93	2	10	92		0	0	0	0	203
15:30				0		6		114	3	7	93		0	0	0	0	223
15:45				1		5		78	4	7	114		0	0	1	0	209
16:00				3		4		113	2	12	137		0	0	2	0	271
16:15				1		6		81	3	18	182		0	0	1	0	291
16:30				1		3		113	1	6	128		0	0	0	0	252
16:45				1		5		92	3	11	137		0	0	0	0	249
17:00				0		6		98	2	11	145		0	0	0	0	262
17:15				4		6		73	3	9	109		1	1	1	0	204
17:30				1		1		79	6	12	97		0	0	1	0	196
17:45				2		7		89	3	6	101		0	0	2	0	208

Project: #5458: McElhanney - South Bonson Traffic Counts
Municipality: Pitt Meadows
Weather: Cloudy
Vehicle Class: All Motorized Vehicles

Morning Peak Period


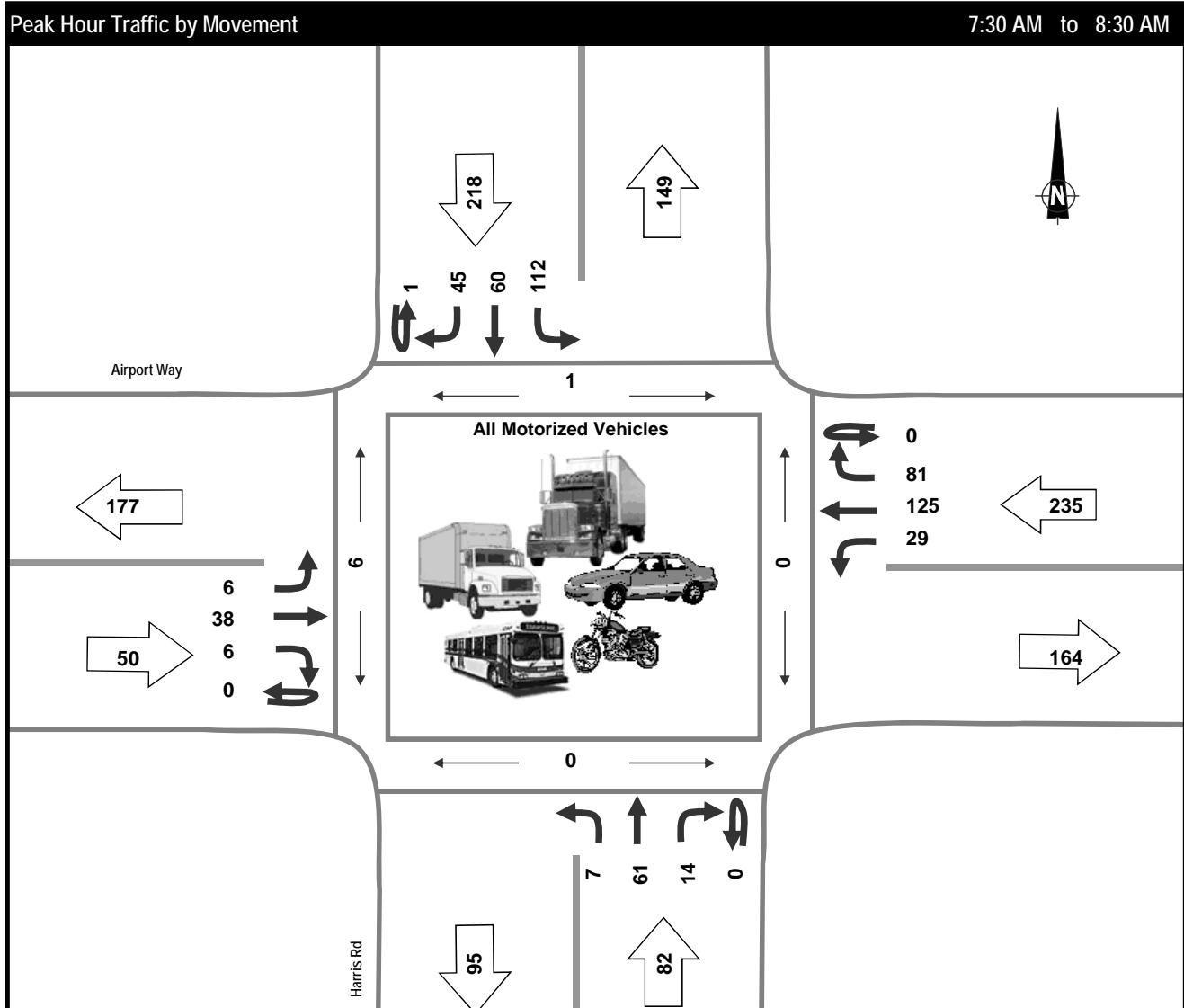
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	4	223			153	1				2	4		0	0	0	3	387
PH Factor	0.50	0.86			0.85	0.25				0.50		0.33	0.00	0.00	0.00	0.38	0.92
Peak 15 X 4	8	260			180	4				4		12	0	0	0	8	420
Average Hour	2	189			135	2				2		4	0	0	0	5	334
Survey Total	4	377			269	3				3		8	0	0	0	9	664
7:00	0	38			26	0				0		1	0	0	0	1	65
7:15	0	37			29	0				0		2	0	0	0	2	68
7:30	0	35			25	0				1		1	0	0	0	2	62
7:45	2	53			45	1				0		0	0	0	0	0	101
8:00	0	47			39	0				1		3	0	0	0	2	90
8:15	1	65			37	0				1		1	0	0	0	1	105
8:30	1	58			32	0				0		0	0	0	0	0	91
8:45	0	44			36	2				0		0	0	0	0	1	82

Project: #5458: McElhanney - South Bonson Traffic Counts
Municipality: Pitt Meadows
Weather: Cloudy
Vehicle Class: All Motorized Vehicles

Afternoon Peak Period


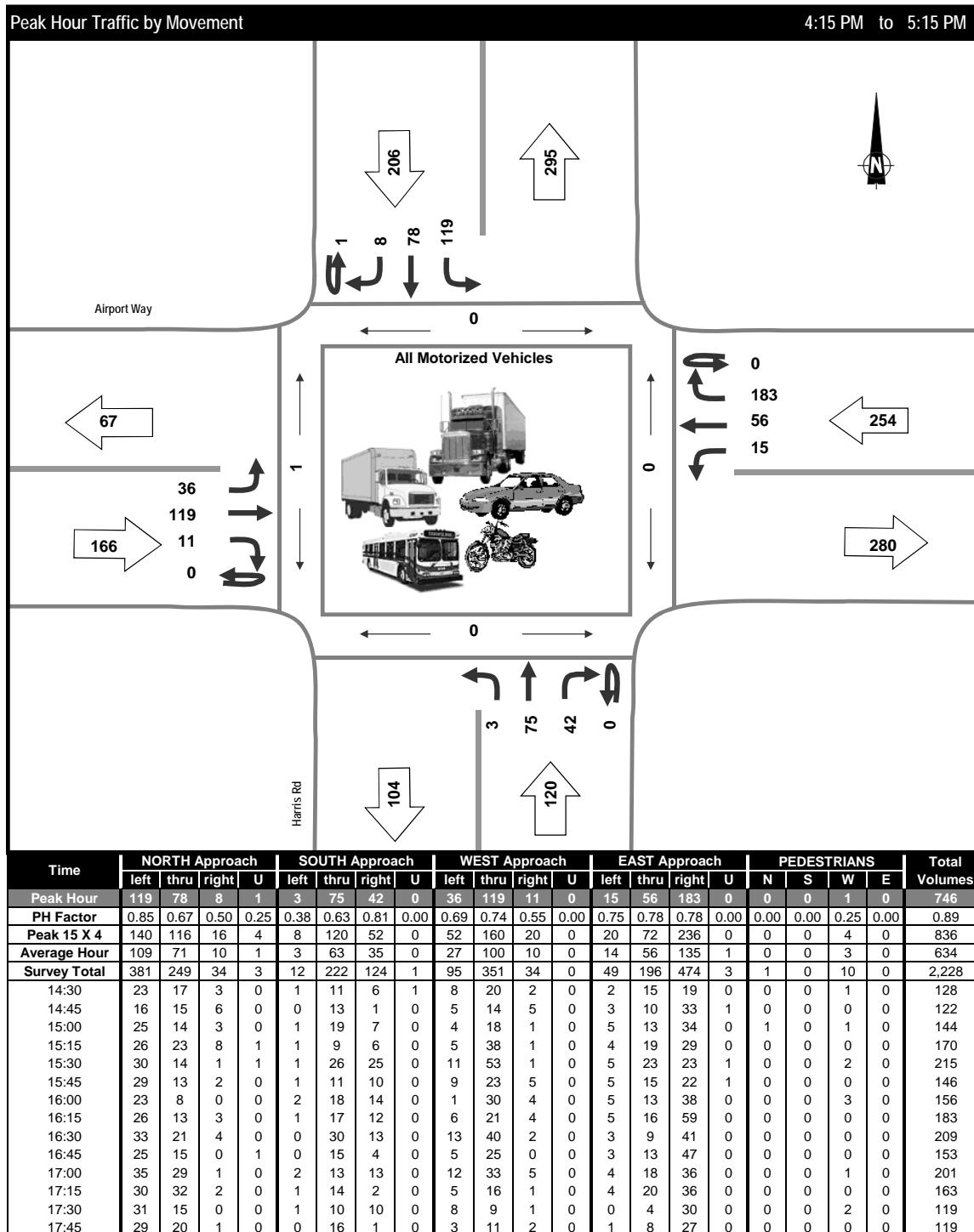
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes	
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E		
Peak Hour	5	225			273	4				5	3		0	0	0	1	515	
PH Factor	0.42	0.79			0.78	0.50				0.42			0.75	0.00	0.00	0.00	0.25	0.78
Peak 15 X 4	12	284			348	8				12			4	0	0	0	4	660
Average Hour	5	178			194	3				3			2	0	0	0	1	385
Survey Total	19	669			728	13				13			9	0	0	0	5	1,451
14:30	0	45			26	2				0			0	0	0	0	0	73
14:45	0	26			20	1				0			0	0	0	0	0	47
15:00	1	47			45	1				1			1	0	0	0	2	96
15:15	3	50			57	1				2			0	0	0	0	0	113
15:30	1	28			76	0				0			0	0	0	0	0	105
15:45	2	63			41	0				1			1	0	0	0	0	108
16:00	1	48			57	3				0			1	0	0	0	1	110
16:15	0	41			53	0				1			1	0	0	0	0	96
16:30	3	71			87	0				3			1	0	0	0	0	165
16:45	0	57			61	2				1			1	0	0	0	0	122
17:00	2	56			72	2				0			0	0	0	0	1	132
17:15	1	43			41	0				1			2	0	0	0	1	88
17:30	3	56			49	0				1			0	0	0	0	0	109
17:45	2	38			43	1				2			1	0	0	0	0	87

Project: #5458: McElhanney - South Bonson Traffic Counts
Municipality: Pitt Meadows
Weather: Cloudy
Vehicle Class: All Motorized Vehicles

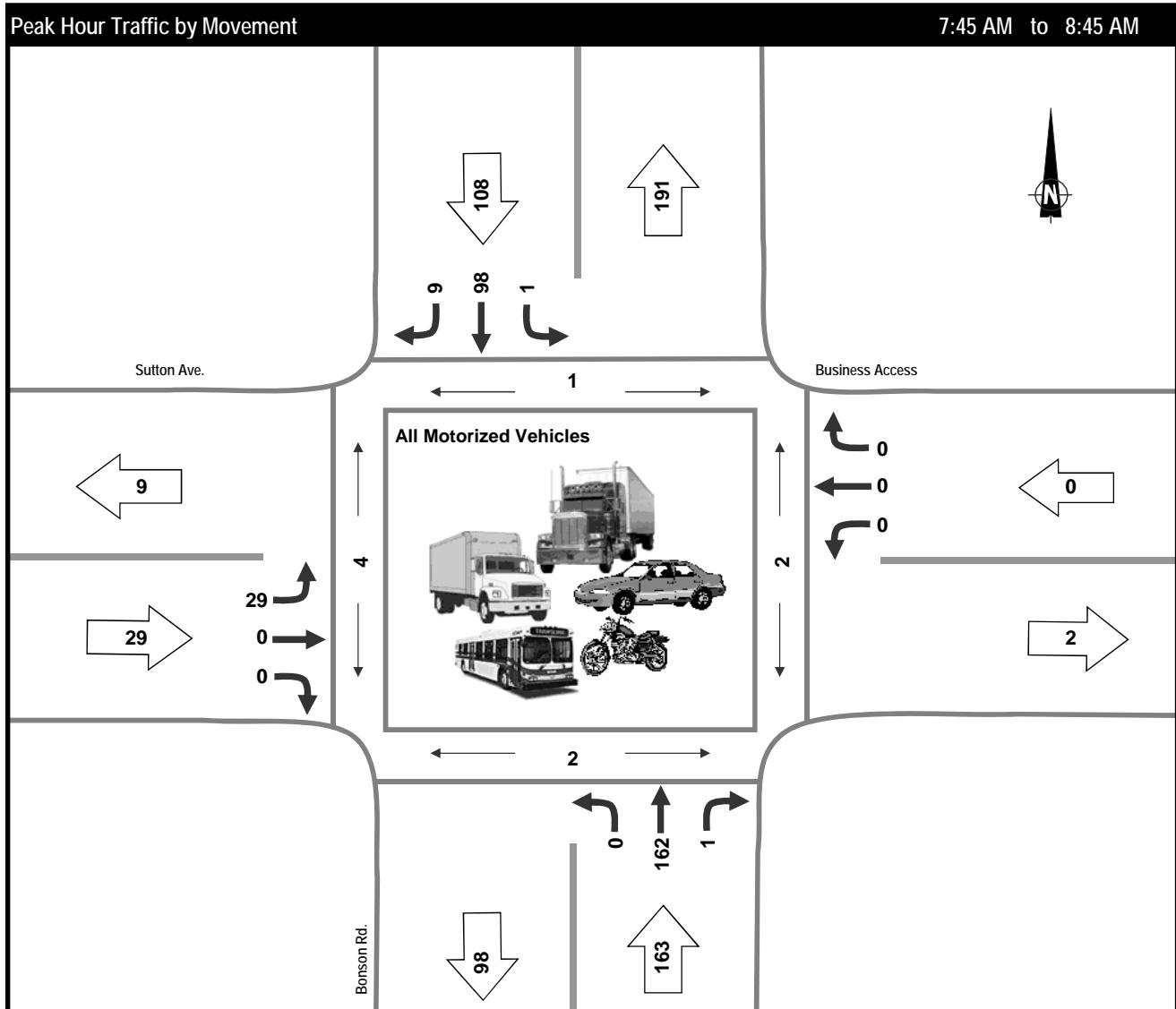
Morning Peak Period


Time	NORTH Approach				SOUTH Approach				WEST Approach				EAST Approach				PEDESTRIANS				Total Volumes				
	left	thru	right	U	left	thru	right	U	left	thru	right	U	left	thru	right	U	N	S	W	E					
Peak Hour	112	60	45	1	7	61	14	0	0.50	0.73	0.75	0.00	0.50	0.73	0.75	0.00	0.81	0.76	0.81	0.00	0.25	0.00	0.50	0.00	0.94
PH Factor	0.76	0.71	0.75	0.25	0.58	0.73	0.58	0.00	0.50	0.73	0.75	0.00	0.29	0.125	0.81	0	1	0	6	0	585				
Peak 15 X 4	148	84	60	4	12	84	24	0	12	52	8	0	36	164	100	0	4	0	12	0	620				
Average Hour	109	44	36	1	5	51	12	1	6	39	5	0	28	103	72	2	1	1	5	0	512				
Survey Total	218	88	71	1	10	101	24	1	11	78	10	0	56	206	143	3	1	1	10	0	1,021				
7:00	28	5	6	0	0	8	0	0	1	8	0	0	5	23	16	0	0	0	2	0	100				
7:15	30	5	6	0	0	10	2	0	0	11	0	0	11	23	13	0	0	0	1	0	111				
7:30	37	8	6	1	0	11	3	0	1	13	2	0	5	41	14	0	0	0	3	0	142				
7:45	24	17	14	0	1	15	0	0	2	8	2	0	9	33	22	0	0	0	0	0	147				
8:00	22	14	10	0	3	21	6	0	0	6	1	0	7	26	25	0	0	0	2	0	141				
8:15	29	21	15	0	3	14	5	0	3	11	1	0	8	25	20	0	1	0	1	0	155				
8:30	23	10	10	0	2	12	3	1	1	11	2	0	3	14	16	1	0	1	1	0	109				
8:45	25	8	4	0	1	10	5	0	3	10	2	0	8	21	17	2	0	0	0	0	116				

Project: #5458: McElhanney - South Bonson Traffic Counts
Municipality: Pitt Meadows
Weather: Cloudy
Vehicle Class: All Motorized Vehicles

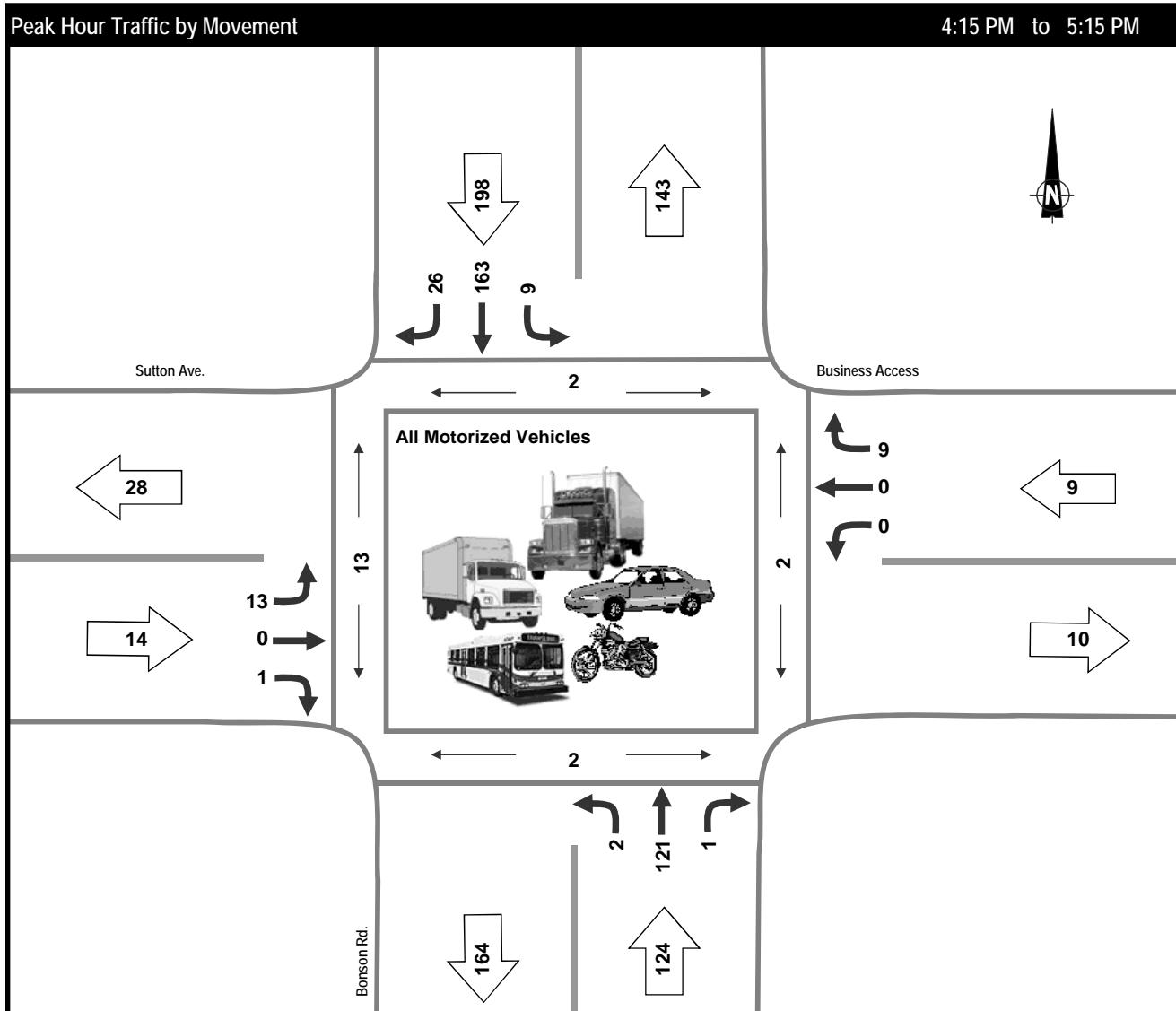
Afternoon Peak Period


Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Rain
 Vehicle Class: All Motorized Vehicles
Notes: Business Access Offset from Intersection

Morning Peak Period


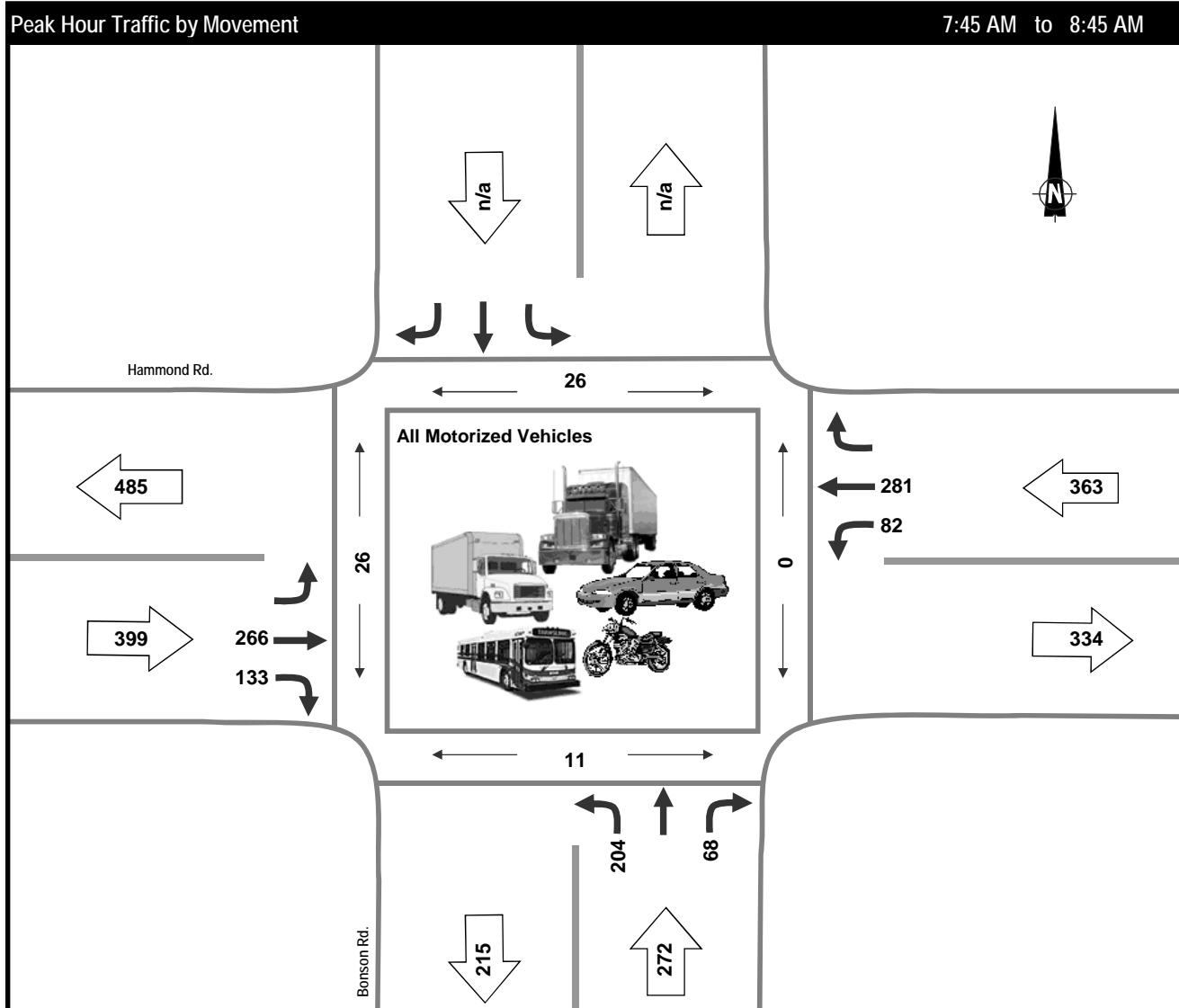
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	1	98	9	0	162	1	29	0	0	0	0	0	1	2	4	2	300
PH Factor	0.25	0.66	0.56	0.00	0.72	0.25	0.48	0.00	0.00	0.00	0.00	0.00	0.25	0.25	0.50	0.25	0.90
Peak 15 X 4	4	148	16	0	224	4	60	0	0	0	0	0	4	8	8	8	332
Average Hour	2	78	6	0	128	1	25	0	1	1	0	1	1	2	6	2	243
Survey Total	3	155	11	0	255	1	49	0	2	1	0	1	2	4	12	4	478
7:00	0	5	1	0	17	0	7	0	1	0	0	0	1	1	0	0	31
7:15	0	16	1	0	25	0	4	0	0	0	0	0	0	0	0	1	46
7:30	0	16	0	0	33	0	5	0	0	0	0	0	0	0	0	0	54
7:45	0	27	2	0	28	0	6	0	0	0	0	0	0	0	1	0	63
8:00	0	18	0	0	56	0	3	0	0	0	0	0	0	2	0	2	77
8:15	0	16	3	0	43	0	15	0	0	0	0	0	1	0	1	0	77
8:30	1	37	4	0	35	1	5	0	0	0	0	0	0	0	2	0	83
8:45	2	20	0	0	18	0	4	0	1	1	0	1	1	1	7	1	47

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Rain
 Vehicle Class: All Motorized Vehicles
Notes: Business Access Offset from Intersection

Afternoon Peak Period


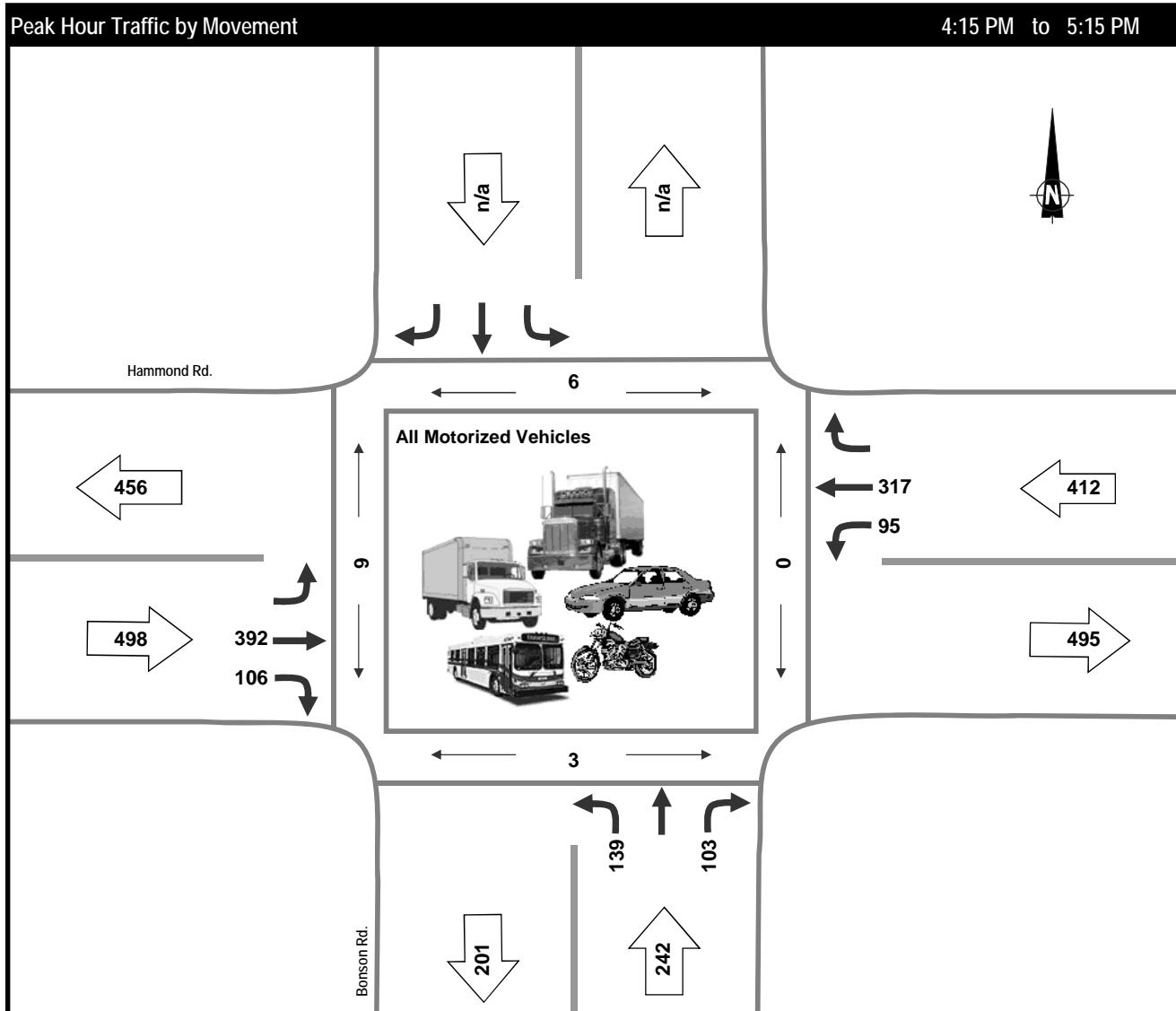
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour	9	163	26	2	121	1	13	0	1	0	0	9	2	2	13	2	345
PH Factor	0.45	0.87	0.59	0.25	0.89	0.25	0.81	0.00	0.25	0.00	0.00	0.56	0.50	0.50	0.54	0.50	0.87
Peak 15 X 4	20	188	44	8	136	4	16	0	4	0	0	16	4	4	24	4	396
Average Hour	5	135	21	1	110	1	11	0	1	0	0	5	1	1	13	1	290
Survey Total	17	474	72	2	386	2	37	0	3	1	0	19	5	4	44	5	1,013
14:30	0	29	5	0	21	0	1	0	0	0	0	0	1	0	5	0	56
14:45	2	31	7	0	31	0	4	0	0	0	0	0	0	2	7	2	75
15:00	2	25	3	0	28	1	2	0	0	0	0	5	1	0	7	0	66
15:15	1	24	2	0	18	0	4	0	0	0	0	2	0	0	1	0	51
15:30	1	30	1	0	27	0	0	0	0	0	0	0	0	0	1	0	59
15:45	1	39	7	0	20	0	2	0	0	1	0	1	0	0	3	1	71
16:00	0	30	3	0	39	0	4	0	1	0	0	1	0	0	0	0	78
16:15	5	47	6	0	34	0	3	0	1	0	0	3	1	0	4	0	99
16:30	3	29	5	0	30	0	4	0	0	0	0	2	1	0	1	1	73
16:45	1	42	4	2	29	0	2	0	0	0	0	4	0	1	2	1	84
17:00	0	45	11	0	28	1	4	0	0	0	0	0	0	1	6	0	89
17:15	0	35	4	0	27	0	2	0	0	0	0	0	0	0	1	0	68
17:30	0	33	8	0	21	0	3	0	0	0	0	0	0	0	3	0	65
17:45	1	35	6	0	33	0	2	0	1	0	0	1	1	0	3	0	79

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles

Morning Peak Period


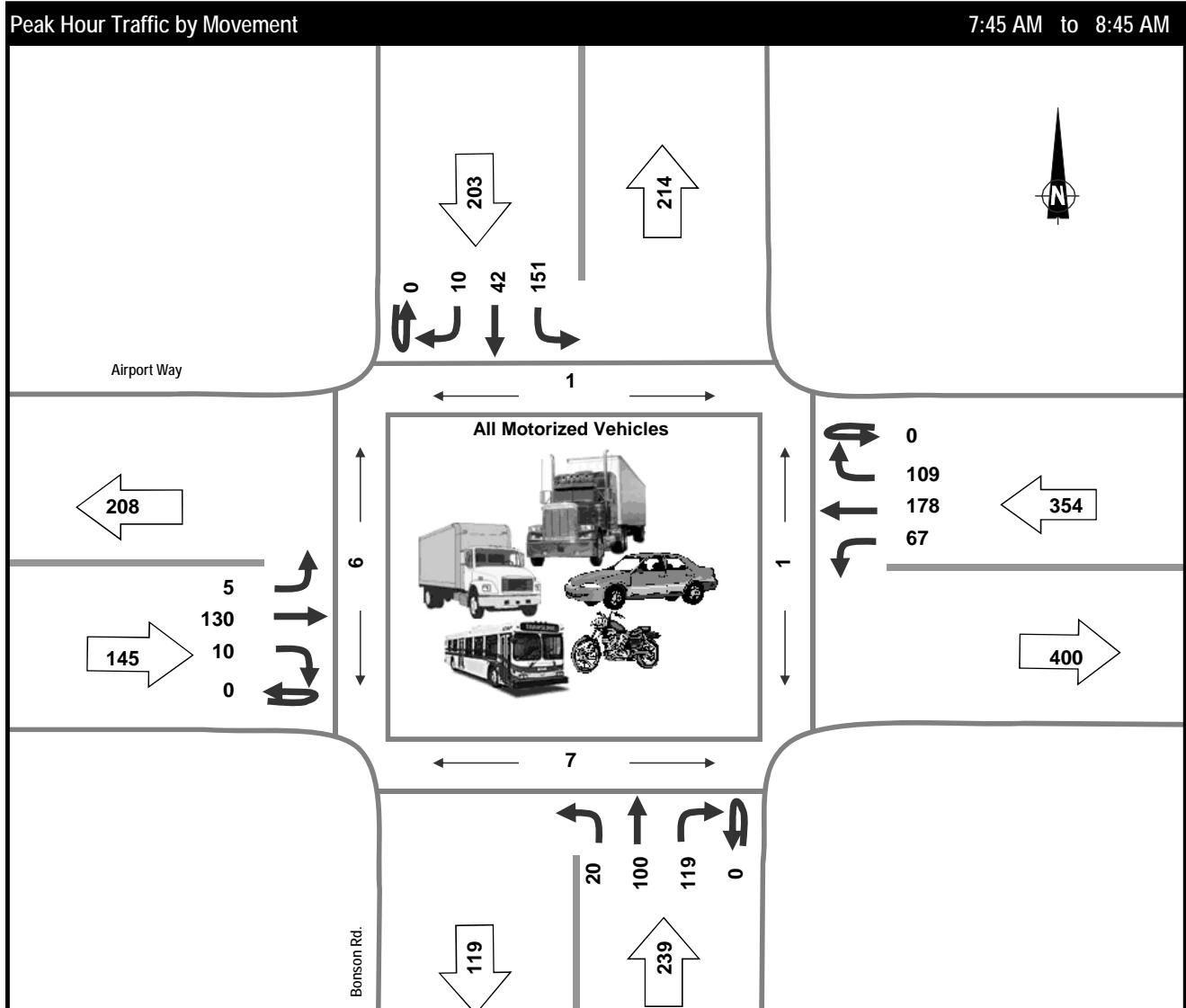
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour				204	68		266	133		82	281		26	11	26	0	1,034
PH Factor				0.60	0.77		0.63	0.58		0.79	0.74		0.50	0.46	0.59	0.00	0.70
Peak 15 X 4				340	88		420	228		104	380		52	24	44	0	1,480
Average Hour				158	50		202	100		58	235		19	8	16	0	803
Survey Total				315	99		403	199		116	469		37	15	31	0	1,601
7:00				24		7		31	16	3	35		1	1	0	0	116
7:15				30		7		34	12	9	52		2	0	1	0	144
7:30				25		7		34	22	12	57		2	2	2	0	157
7:45				36		12		38	21	22	59		0	2	2	0	188
8:00				50		22		38	17	21	74		13	6	11	0	222
8:15				85		21		105	38	26	95		8	2	10	0	370
8:30				33		13		85	57	13	53		5	1	3	0	254
8:45				32		10		38	16	10	44		6	1	2	0	150

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Cloudy
 Vehicle Class: All Motorized Vehicles

Afternoon Peak Period


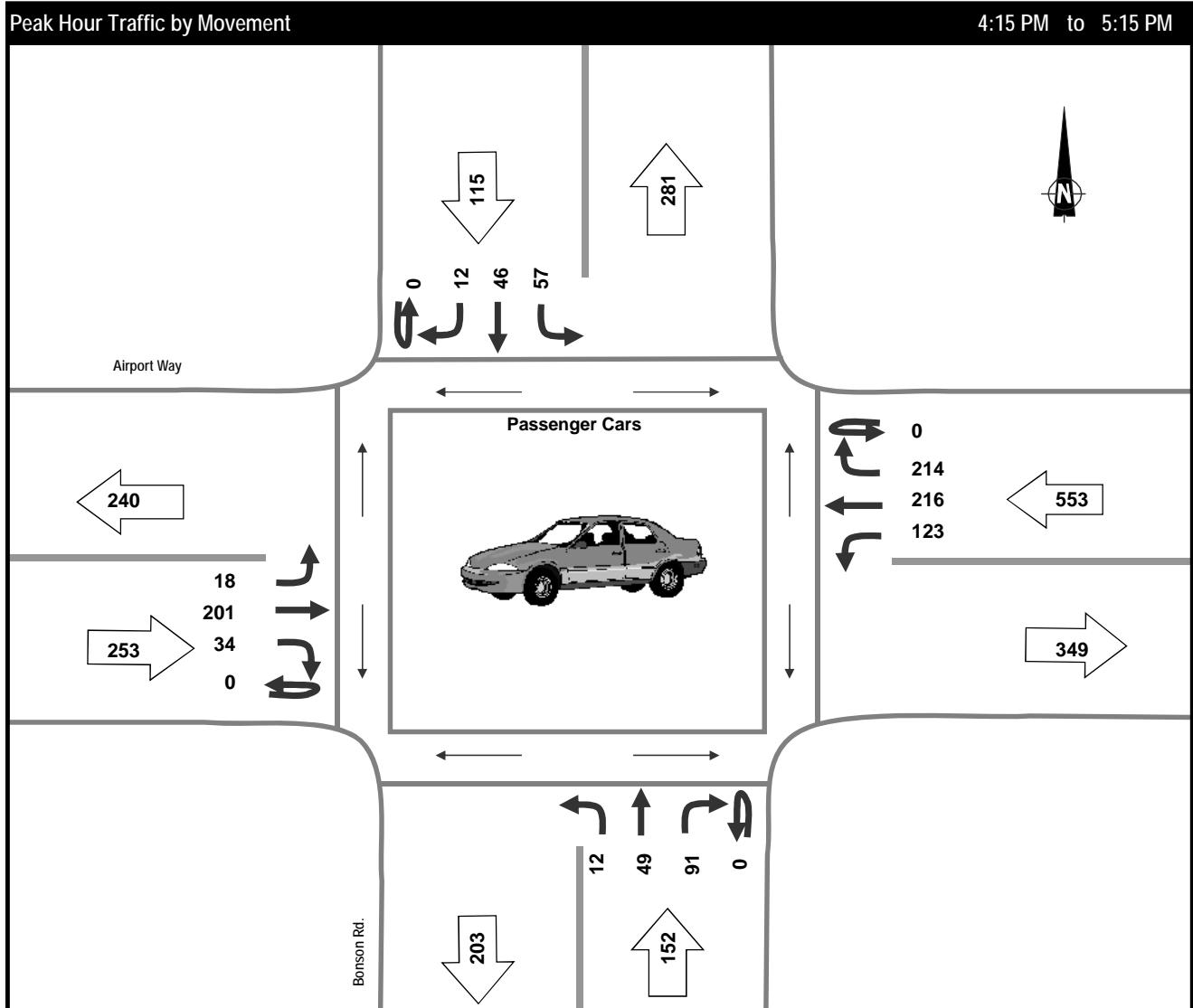
Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			PEDESTRIANS				Total Volumes
	left	thru	right	left	thru	right	left	thru	right	left	thru	right	N	S	W	E	
Peak Hour				139	103		392	106	6	95	317		6	3	9	0	1,152
PH Factor				0.77	0.80		0.88	0.88	0.91	0.87		0.50	0.38	0.56	0.00	0.96	
Peak 15 X 4				180	128		444	120	104	364		12	8	16	0	1,200	
Average Hour				104	83		309	96	85	285		13	9	15	0	962	
Survey Total				391	313		1,157	360	317	1,070		47	34	56	0	3,608	
14:30				19		18	72	32	30	92		10	5	9	0	263	
14:45				30		37	76	18	19	72		14	14	13	0	252	
15:00				26		16	75	19	24	70		4	0	3	0	230	
15:15				25		21	67	27	22	76		0	1	5	0	238	
15:30				28		23	81	21	24	74		5	1	2	0	251	
15:45				22		16	80	39	22	68		0	4	0	0	247	
16:00				24		13	87	28	20	66		4	3	9	0	238	
16:15				23		28	83	26	25	91		3	2	2	0	276	
16:30				45		26	103	30	23	73		3	0	4	0	300	
16:45				42		32	95	25	21	65		0	0	3	0	280	
17:00				29		17	111	25	26	88		0	1	0	0	296	
17:15				30		25	82	31	21	87		1	2	5	0	276	
17:30				21		19	64	16	18	68		1	0	0	0	206	
17:45				27		22	81	23	22	80		2	1	1	0	255	

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Rain
 Vehicle Class: All Motorized Vehicles

Morning Peak Period


Time	NORTH Approach				SOUTH Approach				WEST Approach				EAST Approach				PEDESTRIANS				Total Volumes
	left	thru	right	U	left	thru	right	U	left	thru	right	U	left	thru	right	U	N	S	W	E	
Peak Hour	151	42	10	0	20	100	119	0	5	130	10	0	67	178	109	0	1	7	6	1	941
PH Factor	0.84	0.58	0.63	0.00	0.71	0.47	0.69	0.00	0.42	0.90	0.63	0.00	0.64	0.78	0.59	0.00	0.25	0.58	0.75	0.25	0.79
Peak 15 X 4	180	72	16	0	28	212	172	0	12	144	16	0	104	228	184	0	4	12	8	4	1,192
Average Hour	147	32	10	0	18	73	99	0	8	143	7	0	49	178	78	0	1	5	5	3	842
Survey Total	294	64	20	0	36	145	198	0	16	286	14	0	98	356	156	0	1	9	10	6	1,683
7:00	36	3	3	0	7	10	17	0	3	32	1	0	2	32	6	0	0	0	0	1	152
7:15	53	6	1	0	2	11	21	0	3	43	0	0	9	45	15	0	0	0	0	2	209
7:30	38	4	1	0	2	12	28	0	1	50	2	0	11	55	11	0	0	1	1	1	215
7:45	36	9	4	0	7	18	21	0	0	30	1	0	18	57	18	0	1	0	1	0	219
8:00	32	5	2	0	6	17	43	0	0	28	4	0	11	33	23	0	0	3	2	0	204
8:15	45	10	4	0	4	53	28	0	3	36	3	0	12	54	46	0	0	2	2	0	298
8:30	38	18	0	0	3	12	27	0	2	36	2	0	26	34	22	0	0	2	1	1	220
8:45	16	9	5	0	5	12	13	0	4	31	1	0	9	46	15	0	0	1	3	1	166

Project: #5458: McElhanney - South Bonson Traffic Counts
 Municipality: Pitt Meadows
 Weather: Rain
 Vehicle Class: Passenger Cars

Afternoon Peak Period


Time	NORTH Approach				SOUTH Approach				WEST Approach				EAST Approach				PEDESTRIANS				Total Volumes
	left	thru	right	U	left	thru	right	U	left	thru	right	U	left	thru	right	U	N	S	W	E	
Peak Hour	57	46	12	0	12	49	91	0	18	201	34	0	123	216	214	0					1,073
PH Factor	0.95	0.82	0.60	0.00	0.60	0.88	0.88	0.00	0.64	0.87	0.53	0.00	0.72	0.75	0.79	0.00					0.87
Peak 15 X 4	60	56	20	0	20	56	104	0	28	232	64	0	172	288	272	0					1,228
Average Hour	72	47	14	0	9	43	72	0	13	182	23	0	98	168	152	0					893
Survey Total	270	175	54	0	34	162	269	0	49	683	87	0	368	629	571	0					3,351
14:30	16	12	4	0	1	12	15	0	4	35	3	0	18	30	39	0					189
14:45	38	25	5	0	2	18	13	0	5	34	4	0	24	35	40	0					243
15:00	18	9	3	0	1	16	16	0	3	43	6	0	18	56	27	0					216
15:15	21	13	6	0	4	11	15	0	1	62	3	0	26	43	22	0					227
15:30	15	14	7	0	2	9	17	0	3	70	7	0	22	40	24	0					230
15:45	16	8	4	0	3	6	13	0	4	51	2	0	31	44	32	0					214
16:00	19	14	4	0	1	13	25	0	1	73	4	0	16	55	44	0					269
16:15	13	14	3	0	3	11	24	0	3	46	7	0	43	72	68	0					307
16:30	15	9	2	0	1	14	16	0	3	57	7	0	18	43	49	0					234
16:45	14	12	2	0	5	14	25	0	5	40	4	0	26	51	47	0					245
17:00	15	11	5	0	3	10	26	0	7	58	16	0	36	50	50	0					287
17:15	13	6	5	0	2	7	25	0	3	41	11	0	28	50	46	0					237
17:30	20	15	3	0	2	9	20	0	4	39	12	0	28	30	36	0					218
17:45	37	13	1	0	4	12	19	0	3	34	1	0	34	30	47	0					235

Appendix C

Synchro / SIDRA Output

4: Southgate Road & Airport Way



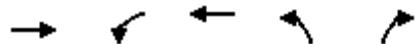
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↖ ↗	↖ ↗	
Traffic Volume (veh/h)	433	6	9	341	12	36
Future Volume (Veh/h)	433	6	9	341	12	36
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	471	7	10	371	13	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		478		866	474	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		478		866	474	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		99		96	93	
cM capacity (veh/h)		1084		321	590	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	478	381	52			
Volume Left	0	10	13			
Volume Right	7	0	39			
cSH	1700	1084	488			
Volume to Capacity	0.28	0.01	0.11			
Queue Length 95th (m)	0.0	0.2	2.8			
Control Delay (s)	0.0	0.3	13.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.3	13.3			
Approach LOS		B				
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		35.2%		ICU Level of Service		A
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (veh/h)	2	4	153	1	4	223
Future Volume (Veh/h)	2	4	153	1	4	223
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	4	166	1	4	242
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	416	166		167		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	416	166		167		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	100	100		100		
cM capacity (veh/h)	591	878		1411		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	6	167	246			
Volume Left	2	0	4			
Volume Right	4	1	0			
cSH	756	1700	1411			
Volume to Capacity	0.01	0.10	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	9.8	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	9.8	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		24.9%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↑←	↑→	↑←	↑→
Traffic Volume (vph)	226	82	281	204	68
Future Volume (vph)	226	82	281	204	68
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			2	2	
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	24.0	10.5	34.5	25.5	25.5
Total Split (%)	40.0%	17.5%	57.5%	42.5%	42.5%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	15.0	20.0	20.5	22.3	22.3
Actuated g/C Ratio	0.29	0.39	0.40	0.44	0.44
v/c Ratio	0.70	0.27	0.41	0.29	0.10
Control Delay	22.0	10.6	11.6	13.6	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	10.6	11.6	13.6	4.4
LOS	C	B	B	B	A
Approach Delay	22.0		11.4	11.3	
Approach LOS	C		B	B	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 51.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 15.2

Intersection LOS: B

Intersection Capacity Utilization 46.7%

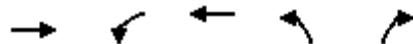
ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	391	89	305	222	74
v/c Ratio	0.70	0.27	0.41	0.29	0.10
Control Delay	22.0	10.6	11.6	13.6	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	10.6	11.6	13.6	4.4
Queue Length 50th (m)	31.9	5.0	19.1	16.1	0.0
Queue Length 95th (m)	58.0	11.2	33.3	33.9	7.0
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0		30.0	
Base Capacity (vph)	750	330	1153	772	732
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	0.52	0.27	0.26	0.29	0.10

Intersection Summary

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	68	76	121	181	149	56
Future Volume (Veh/h)	68	76	121	181	149	56
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	83	132	197	162	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	654	192	223			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654	192	223			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	90	90			
cM capacity (veh/h)	389	849	1346			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	157	329	223			
Volume Left	74	132	0			
Volume Right	83	0	61			
cSH	546	1346	1700			
Volume to Capacity	0.29	0.10	0.13			
Queue Length 95th (m)	9.5	2.6	0.0			
Control Delay (s)	14.2	3.7	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.2	3.7	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		4.9				
Intersection Capacity Utilization	45.9%		ICU Level of Service		A	
Analysis Period (min)		15				

8: Bonson Road & 116a Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	45	257	6	23	202
Future Volume (Veh/h)	10	45	257	6	23	202
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	49	279	7	25	220
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	552	282			286	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552	282			286	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	94			98	
cM capacity (veh/h)	485	756			1276	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	60	286	245			
Volume Left	11	0	25			
Volume Right	49	7	0			
cSH	686	1700	1276			
Volume to Capacity	0.09	0.17	0.02			
Queue Length 95th (m)	2.3	0.0	0.5			
Control Delay (s)	10.8	0.0	1.0			
Lane LOS	B		A			
Approach Delay (s)	10.8	0.0	1.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		39.1%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	1	1	162	98	9
Future Volume (Veh/h)	29	1	1	162	98	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	1	1	176	107	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	290	112	117			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	112	117			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	700	941	1471			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	33	177	117			
Volume Left	32	1	0			
Volume Right	1	0	10			
cSH	706	1471	1700			
Volume to Capacity	0.05	0.00	0.07			
Queue Length 95th (m)	1.2	0.0	0.0			
Control Delay (s)	10.4	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.4	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		19.3%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way



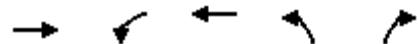
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗		↗ ↙	↖ ↖	↖ ↙	
Traffic Volume (veh/h)	399	9	47	584	6	18
Future Volume (Veh/h)	399	9	47	584	6	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	434	10	51	635	7	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		444		1176	439	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		444		1176	439	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		95		97	97	
cM capacity (veh/h)		1116		202	618	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	444	686	27			
Volume Left	0	51	7			
Volume Right	10	0	20			
cSH	1700	1116	403			
Volume to Capacity	0.26	0.05	0.07			
Queue Length 95th (m)	0.0	1.1	1.7			
Control Delay (s)	0.0	1.2	14.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.2	14.6			
Approach LOS			B			
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		68.2%		ICU Level of Service		C
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	3	273	4	5	225
Future Volume (Veh/h)	5	3	273	4	5	225
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	3	297	4	5	245
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	554	299			301	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554	299			301	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	491	741			1260	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	301	250			
Volume Left	5	0	5			
Volume Right	3	4	0			
cSH	562	1700	1260			
Volume to Capacity	0.01	0.18	0.00			
Queue Length 95th (m)	0.3	0.0	0.1			
Control Delay (s)	11.5	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	11.5	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		25.9%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↑←	↑→	↑←	↑→
Traffic Volume (vph)	392	95	317	139	103
Future Volume (vph)	392	95	317	139	103
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			2	2	
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	24.0	10.5	34.5	25.5	25.5
Total Split (%)	40.0%	17.5%	57.5%	42.5%	42.5%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	18.7	26.2	26.7	21.9	21.9
Actuated g/C Ratio	0.33	0.46	0.47	0.39	0.39
v/c Ratio	0.88	0.34	0.39	0.22	0.16
Control Delay	36.9	11.2	10.8	14.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	11.2	10.8	14.6	4.0
LOS	D	B	B	B	A
Approach Delay	36.9		10.9	10.1	
Approach LOS	D		B	B	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 56.7

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 22.0

Intersection LOS: C

Intersection Capacity Utilization 50.5%

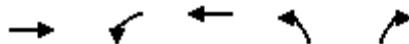
ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	541	103	345	151	112
v/c Ratio	0.88	0.34	0.39	0.22	0.16
Control Delay	36.9	11.2	10.8	14.6	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	11.2	10.8	14.6	4.0
Queue Length 50th (m)	55.4	5.8	22.2	11.9	0.0
Queue Length 95th (m)	#109.5	12.7	38.1	23.7	8.6
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0			30.0
Base Capacity (vph)	665	304	1020	683	680
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.81	0.34	0.34	0.22	0.16

Intersection Summary

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

Queue shown is maximum after two cycles.

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	38	63	219	188	28
Future Volume (Veh/h)	32	38	63	219	188	28
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	41	68	238	204	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	593	219	234			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	593	219	234			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	95	95			
cM capacity (veh/h)	444	821	1333			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	76	306	234			
Volume Left	35	68	0			
Volume Right	41	0	30			
cSH	590	1333	1700			
Volume to Capacity	0.13	0.05	0.14			
Queue Length 95th (m)	3.5	1.3	0.0			
Control Delay (s)	12.0	2.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.0	2.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.5				
Intersection Capacity Utilization	40.7%		ICU Level of Service		A	
Analysis Period (min)		15				

8: Bonson Road & 116a Ave

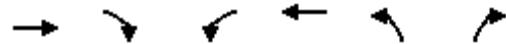


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	24	258	18	29	197
Future Volume (Veh/h)	10	24	258	18	29	197
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	26	280	20	32	214
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	568	290			300	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	568	290			300	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	97			97	
cM capacity (veh/h)	472	749			1261	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	37	300	246			
Volume Left	11	0	32			
Volume Right	26	20	0			
cSH	638	1700	1261			
Volume to Capacity	0.06	0.18	0.03			
Queue Length 95th (m)	1.5	0.0	0.6			
Control Delay (s)	11.0	0.0	1.2			
Lane LOS	B		A			
Approach Delay (s)	11.0	0.0	1.2			
Approach LOS	B					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		40.0%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	1	2	121	163	26
Future Volume (Veh/h)	13	1	2	121	163	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	1	2	132	177	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	327	191	205			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	327	191	205			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	666	851	1366			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	15	134	205			
Volume Left	14	2	0			
Volume Right	1	0	28			
cSH	676	1366	1700			
Volume to Capacity	0.02	0.00	0.12			
Queue Length 95th (m)	0.5	0.0	0.0			
Control Delay (s)	10.4	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.4	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		20.2%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

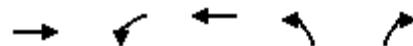
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	476	7	10	375	13	40
Future Volume (Veh/h)	476	7	10	375	13	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	517	8	11	408	14	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		525		951	521	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		525		951	521	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		99		95	92	
cM capacity (veh/h)		1042		285	555	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	525	419	57			
Volume Left	0	11	14			
Volume Right	8	0	43			
cSH	1700	1042	451			
Volume to Capacity	0.31	0.01	0.13			
Queue Length 95th (m)	0.0	0.3	3.4			
Control Delay (s)	0.0	0.3	14.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.3	14.1			
Approach LOS			B			
Intersection Summary						
Average Delay		0.9				
Intersection Capacity Utilization		37.8%		ICU Level of Service		A
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	4	168	1	4	245
Future Volume (Veh/h)	2	4	168	1	4	245
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	4	183	1	4	266
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	458	184		184		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	458	184		184		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	100	100		100		
cM capacity (veh/h)	560	859		1391		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	6	184	270			
Volume Left	2	0	4			
Volume Right	4	1	0			
cSH	729	1700	1391			
Volume to Capacity	0.01	0.11	0.00			
Queue Length 95th (m)	0.2	0.0	0.1			
Control Delay (s)	10.0	0.0	0.1			
Lane LOS	A		A			
Approach Delay (s)	10.0	0.0	0.1			
Approach LOS	A					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		26.1%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↑←	↑	↑←	↑→
Traffic Volume (vph)	249	90	309	224	75
Future Volume (vph)	249	90	309	224	75
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			2	2	
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	24.0	10.5	34.5	25.5	25.5
Total Split (%)	40.0%	17.5%	57.5%	42.5%	42.5%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	15.9	23.2	23.8	22.1	22.1
Actuated g/C Ratio	0.29	0.43	0.44	0.41	0.41
v/c Ratio	0.77	0.31	0.41	0.34	0.12
Control Delay	26.0	10.8	11.2	15.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	10.8	11.2	15.0	4.3
LOS	C	B	B	B	A
Approach Delay	26.0		11.1	12.3	
Approach LOS	C		B	B	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 54.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 16.9

Intersection LOS: B

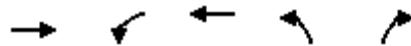
Intersection Capacity Utilization 49.8%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	430	98	336	243	82
v/c Ratio	0.77	0.31	0.41	0.34	0.12
Control Delay	26.0	10.8	11.2	15.0	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	10.8	11.2	15.0	4.3
Queue Length 50th (m)	36.7	5.5	21.4	18.8	0.0
Queue Length 95th (m)	65.8	12.1	37.0	37.1	7.3
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0		30.0	
Base Capacity (vph)	705	317	1080	723	695
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	0.61	0.31	0.31	0.34	0.12

Intersection Summary

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	84	133	199	164	62
Future Volume (Veh/h)	75	84	133	199	164	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	91	145	216	178	67
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	718	212	245			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	718	212	245			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	89	89			
cM capacity (veh/h)	353	829	1321			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	173	361	245			
Volume Left	82	145	0			
Volume Right	91	0	67			
cSH	505	1321	1700			
Volume to Capacity	0.34	0.11	0.14			
Queue Length 95th (m)	12.1	3.0	0.0			
Control Delay (s)	15.8	3.8	0.0			
Lane LOS	C	A				
Approach Delay (s)	15.8	3.8	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		5.3				
Intersection Capacity Utilization	49.5%		ICU Level of Service		A	
Analysis Period (min)		15				

8: Bonson Road & 116a Ave



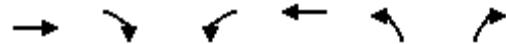
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	50	283	7	25	222
Future Volume (Veh/h)	11	50	283	7	25	222
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	54	308	8	27	241
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	607	312			316	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	607	312			316	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	93			98	
cM capacity (veh/h)	450	728			1244	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	66	316	268			
Volume Left	12	0	27			
Volume Right	54	8	0			
cSH	654	1700	1244			
Volume to Capacity	0.10	0.19	0.02			
Queue Length 95th (m)	2.7	0.0	0.5			
Control Delay (s)	11.1	0.0	1.0			
Lane LOS	B		A			
Approach Delay (s)	11.1	0.0	1.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		42.1%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	32	0	0	178	108	10
Future Volume (Veh/h)	32	0	0	178	108	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	35	0	0	193	117	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	316	122	128			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	122	128			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	100	100			
cM capacity (veh/h)	677	929	1458			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	35	193	128			
Volume Left	35	0	0			
Volume Right	0	0	11			
cSH	677	1458	1700			
Volume to Capacity	0.05	0.00	0.08			
Queue Length 95th (m)	1.3	0.0	0.0			
Control Delay (s)	10.6	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	10.6	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		19.4%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way



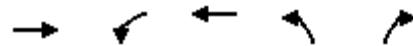
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↖ ↘	↖ ↗	
Traffic Volume (veh/h)	439	10	52	642	7	20
Future Volume (Veh/h)	439	10	52	642	7	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	477	11	57	698	8	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		488		1294	482	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		488		1294	482	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		95		95	96	
cM capacity (veh/h)		1075		170	584	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	488	755	30			
Volume Left	0	57	8			
Volume Right	11	0	22			
cSH	1700	1075	354			
Volume to Capacity	0.29	0.05	0.08			
Queue Length 95th (m)	0.0	1.3	2.2			
Control Delay (s)	0.0	1.4	16.1			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.4	16.1			
Approach LOS			C			
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		73.7%		ICU Level of Service		D
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	3	300	4	6	248
Future Volume (Veh/h)	6	3	300	4	6	248
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	3	326	4	7	270
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	612	328		330		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	612	328		330		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	98	100		99		
cM capacity (veh/h)	454	713		1229		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	330	277			
Volume Left	7	0	7			
Volume Right	3	4	0			
cSH	509	1700	1229			
Volume to Capacity	0.02	0.19	0.01			
Queue Length 95th (m)	0.5	0.0	0.1			
Control Delay (s)	12.2	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	12.2	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		27.9%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↑←	↑→	↑←	↑→
Traffic Volume (vph)	431	105	349	153	113
Future Volume (vph)	431	105	349	153	113
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			2	2	
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	24.0	10.6	34.6	25.4	25.4
Total Split (%)	40.0%	17.7%	57.7%	42.3%	42.3%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	19.8	27.5	28.0	21.6	21.6
Actuated g/C Ratio	0.34	0.48	0.49	0.38	0.38
v/c Ratio	0.93	0.38	0.42	0.25	0.18
Control Delay	44.1	11.8	11.0	14.9	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	11.8	11.0	14.9	4.0
LOS	D	B	B	B	A
Approach Delay	44.1		11.2	10.3	
Approach LOS	D		B	B	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 57.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 25.2

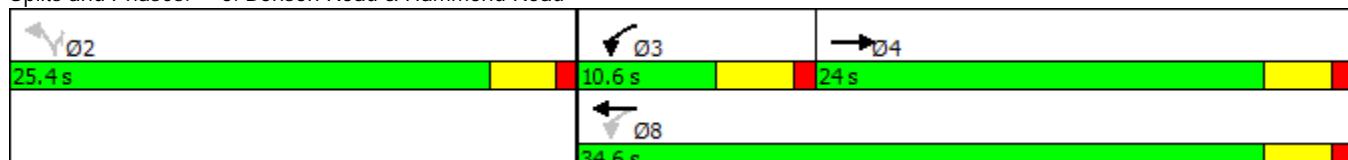
Intersection LOS: C

Intersection Capacity Utilization 54.5%

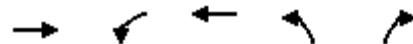
ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	595	114	379	166	123
V/c Ratio	0.93	0.38	0.42	0.25	0.18
Control Delay	44.1	11.8	11.0	14.9	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	44.1	11.8	11.0	14.9	4.0
Queue Length 50th (m)	63.9	6.5	24.8	13.3	0.0
Queue Length 95th (m)	#125.5	13.7	42.1	25.8	9.0
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0		30.0	
Base Capacity (vph)	648	302	997	662	669
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	0.92	0.38	0.38	0.25	0.18

Intersection Summary

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

Queue shown is maximum after two cycles.

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	42	69	241	207	31
Future Volume (Veh/h)	35	42	69	241	207	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	46	75	262	225	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	654	242	259			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654	242	259			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	94	94			
cM capacity (veh/h)	407	797	1306			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	84	337	259			
Volume Left	38	75	0			
Volume Right	46	0	34			
cSH	556	1306	1700			
Volume to Capacity	0.15	0.06	0.15			
Queue Length 95th (m)	4.2	1.5	0.0			
Control Delay (s)	12.6	2.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.6	2.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		43.8%		ICU Level of Service		A
Analysis Period (min)		15				

8: Bonson Road & 116a Ave

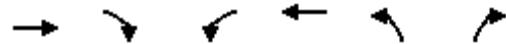


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	26	284	20	32	217
Future Volume (Veh/h)	11	26	284	20	32	217
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	28	309	22	35	236
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	626	320			331	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	626	320			331	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	96			97	
cM capacity (veh/h)	435	721			1228	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	331	271			
Volume Left	12	0	35			
Volume Right	28	22	0			
cSH	602	1700	1228			
Volume to Capacity	0.07	0.19	0.03			
Queue Length 95th (m)	1.7	0.0	0.7			
Control Delay (s)	11.4	0.0	1.3			
Lane LOS	B		A			
Approach Delay (s)	11.4	0.0	1.3			
Approach LOS	B					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		42.7%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	1	2	133	179	29
Future Volume (Veh/h)	14	1	2	133	179	29
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	1	2	145	195	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	360	211	227			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	360	211	227			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	638	829	1341			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	16	147	227			
Volume Left	15	2	0			
Volume Right	1	0	32			
cSH	647	1341	1700			
Volume to Capacity	0.02	0.00	0.13			
Queue Length 95th (m)	0.6	0.0	0.0			
Control Delay (s)	10.7	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	10.7	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		21.2%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

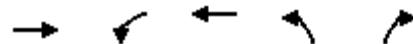
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	563	8	12	443	16	47
Future Volume (Veh/h)	563	8	12	443	16	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	612	9	13	482	17	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		621		1124	616	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		621		1124	616	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		99		92	90	
cM capacity (veh/h)		960		224	490	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	621	495	68			
Volume Left	0	13	17			
Volume Right	9	0	51			
cSH	1700	960	378			
Volume to Capacity	0.37	0.01	0.18			
Queue Length 95th (m)	0.0	0.3	5.2			
Control Delay (s)	0.0	0.4	16.6			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.4	16.6			
Approach LOS			C			
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		43.4%		ICU Level of Service		A
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	N	N	S	S
Traffic Volume (veh/h)	3	5	199	1	5	290
Future Volume (Veh/h)	3	5	199	1	5	290
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	5	216	1	5	315
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	542	216		217		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	542	216		217		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	99	99		100		
cM capacity (veh/h)	500	823		1353		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	217	320			
Volume Left	3	0	5			
Volume Right	5	1	0			
cSH	663	1700	1353			
Volume to Capacity	0.01	0.13	0.00			
Queue Length 95th (m)	0.3	0.0	0.1			
Control Delay (s)	10.5	0.0	0.2			
Lane LOS	B		A			
Approach Delay (s)	10.5	0.0	0.2			
Approach LOS	B					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		29.3%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑→	↑ ↙	↑ ←	↑ ↙	↑ ↘
Traffic Volume (vph)	293	107	365	265	88
Future Volume (vph)	293	107	365	265	88
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			8	2	2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	24.0	10.6	34.6	25.4	25.4
Total Split (%)	40.0%	17.7%	57.7%	42.3%	42.3%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	17.7	25.2	25.7	21.9	21.9
Actuated g/C Ratio	0.32	0.45	0.46	0.39	0.39
v/c Ratio	0.85	0.37	0.46	0.41	0.14
Control Delay	31.9	11.7	11.7	16.6	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	11.7	11.7	16.6	4.2
LOS	C	B	B	B	A
Approach Delay	31.9		11.7	13.5	
Approach LOS	C		B	B	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 55.8

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 19.4

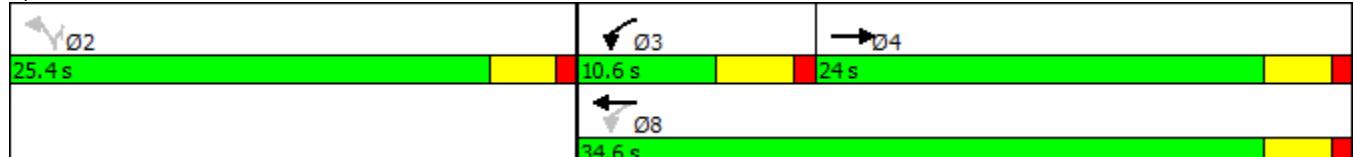
Intersection LOS: B

Intersection Capacity Utilization 57.0%

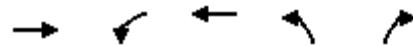
ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	506	116	397	288	96
v/c Ratio	0.85	0.37	0.46	0.41	0.14
Control Delay	31.9	11.7	11.7	16.6	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	11.7	11.7	16.6	4.2
Queue Length 50th (m)	47.0	6.6	26.3	24.9	0.0
Queue Length 95th (m)	#96.0	13.9	44.5	44.2	8.0
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0		30.0	
Base Capacity (vph)	683	311	1046	695	679
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	0.74	0.37	0.38	0.41	0.14

Intersection Summary

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

Queue shown is maximum after two cycles.

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	88	99	157	235	194	73
Future Volume (Veh/h)	88	99	157	235	194	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	96	108	171	255	211	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	848	250	290			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	848	250	290			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	67	86	87			
cM capacity (veh/h)	287	788	1272			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	204	426	290			
Volume Left	96	171	0			
Volume Right	108	0	79			
cSH	433	1272	1700			
Volume to Capacity	0.47	0.13	0.17			
Queue Length 95th (m)	19.7	3.7	0.0			
Control Delay (s)	20.5	4.1	0.0			
Lane LOS	C	A				
Approach Delay (s)	20.5	4.1	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		6.4				
Intersection Capacity Utilization		56.7%		ICU Level of Service		B
Analysis Period (min)		15				

8: Bonson Road & 116a Ave

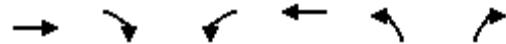


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	59	334	8	30	263
Future Volume (Veh/h)	13	59	334	8	30	263
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	64	363	9	33	286
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	720	368			372	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	720	368			372	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	91			97	
cM capacity (veh/h)	384	678			1186	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	78	372	319			
Volume Left	14	0	33			
Volume Right	64	9	0			
cSH	596	1700	1186			
Volume to Capacity	0.13	0.22	0.03			
Queue Length 95th (m)	3.6	0.0	0.7			
Control Delay (s)	11.9	0.0	1.1			
Lane LOS	B		A			
Approach Delay (s)	11.9	0.0	1.1			
Approach LOS	B					
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization		47.9%		ICU Level of Service		A
Analysis Period (min)			15			

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	1	1	211	127	12
Future Volume (Veh/h)	38	1	1	211	127	12
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	1	1	229	138	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	376	144	151			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376	144	151			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	100	100			
cM capacity (veh/h)	625	903	1430			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	42	230	151			
Volume Left	41	1	0			
Volume Right	1	0	13			
cSH	630	1430	1700			
Volume to Capacity	0.07	0.00	0.09			
Queue Length 95th (m)	1.7	0.0	0.0			
Control Delay (s)	11.1	0.0	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.1	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		21.9%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

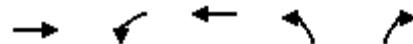
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↗ ↙	↖ ↗	
Traffic Volume (veh/h)	519	12	61	759	8	23
Future Volume (Veh/h)	519	12	61	759	8	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	564	13	66	825	9	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		577		1528	570	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		577		1528	570	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		93		93	95	
cM capacity (veh/h)		996		121	521	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	577	891	34			
Volume Left	0	66	9			
Volume Right	13	0	25			
cSH	1700	996	277			
Volume to Capacity	0.34	0.07	0.12			
Queue Length 95th (m)	0.0	1.7	3.3			
Control Delay (s)	0.0	1.7	19.8			
Lane LOS		A	C			
Approach Delay (s)	0.0	1.7	19.8			
Approach LOS			C			
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		84.7%		ICU Level of Service		E
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	4	355	5	7	293
Future Volume (Veh/h)	7	4	355	5	7	293
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	4	386	5	8	318
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	722	388			391	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	722	388			391	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	391	660			1168	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	12	391	326			
Volume Left	8	0	8			
Volume Right	4	5	0			
cSH	452	1700	1168			
Volume to Capacity	0.03	0.23	0.01			
Queue Length 95th (m)	0.7	0.0	0.2			
Control Delay (s)	13.2	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	13.2	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		31.0%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↑ ↗
Traffic Volume (vph)	510	124	412	181	134
Future Volume (vph)	510	124	412	181	134
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			8	2	2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	34.0	10.6	44.6	25.4	25.4
Total Split (%)	48.6%	15.1%	63.7%	36.3%	36.3%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	27.5	34.9	35.4	21.9	21.9
Actuated g/C Ratio	0.42	0.53	0.54	0.33	0.33
v/c Ratio	0.91	0.50	0.44	0.33	0.23
Control Delay	36.3	14.0	10.2	20.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	14.0	10.2	20.6	4.9
LOS	D	B	B	C	A
Approach Delay	36.3		11.1	13.9	
Approach LOS	D		B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 65.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 22.6

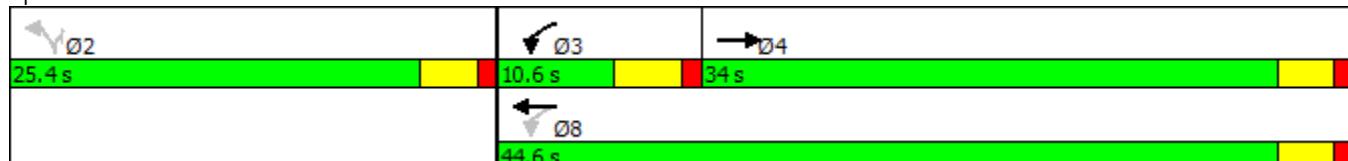
Intersection LOS: C

Intersection Capacity Utilization 62.5%

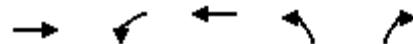
ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	704	135	448	197	146
v/c Ratio	0.91	0.50	0.44	0.33	0.23
Control Delay	36.3	14.0	10.2	20.6	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	14.0	10.2	20.6	4.9
Queue Length 50th (m)	83.7	7.8	30.7	21.0	0.0
Queue Length 95th (m)	#151.8	16.2	49.3	38.0	11.6
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0			30.0
Base Capacity (vph)	859	270	1180	591	626
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	0.82	0.50	0.38	0.33	0.23

Intersection Summary

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

Queue shown is maximum after two cycles.

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	49	82	285	244	36
Future Volume (Veh/h)	42	49	82	285	244	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	53	89	310	265	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	772	284	304			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	772	284	304			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	93	93			
cM capacity (veh/h)	342	754	1257			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	99	399	304			
Volume Left	46	89	0			
Volume Right	53	0	39			
cSH	483	1257	1700			
Volume to Capacity	0.20	0.07	0.18			
Queue Length 95th (m)	6.1	1.8	0.0			
Control Delay (s)	14.4	2.3	0.0			
Lane LOS	B	A				
Approach Delay (s)	14.4	2.3	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization	49.9%		ICU Level of Service		A	
Analysis Period (min)		15				

8: Bonson Road & 116a Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	31	335	23	38	256
Future Volume (Veh/h)	13	31	335	23	38	256
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	34	364	25	41	278
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	736	376			389	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736	376			389	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	95			96	
cM capacity (veh/h)	372	670			1170	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	48	389	319			
Volume Left	14	0	41			
Volume Right	34	25	0			
cSH	543	1700	1170			
Volume to Capacity	0.09	0.23	0.04			
Queue Length 95th (m)	2.3	0.0	0.9			
Control Delay (s)	12.3	0.0	1.4			
Lane LOS	B		A			
Approach Delay (s)	12.3	0.0	1.4			
Approach LOS	B					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		47.9%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	1	3	157	212	34
Future Volume (Veh/h)	17	1	3	157	212	34
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	1	3	171	230	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426	248	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	248	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	97	100	100			
cM capacity (veh/h)	584	790	1297			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	19	174	267			
Volume Left	18	3	0			
Volume Right	1	0	37			
cSH	592	1297	1700			
Volume to Capacity	0.03	0.00	0.16			
Queue Length 95th (m)	0.8	0.1	0.0			
Control Delay (s)	11.3	0.2	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.3	0.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		0.5				
Intersection Capacity Utilization		23.2%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

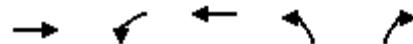
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↗ ↙	↖ ↗	
Traffic Volume (veh/h)	638	7	10	914	13	40
Future Volume (Veh/h)	638	7	10	914	13	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	693	8	11	993	14	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		701		1712	697	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		701		1712	697	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		99		86	90	
cM capacity (veh/h)		896		98	441	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	701	1004	57			
Volume Left	0	11	14			
Volume Right	8	0	43			
cSH	1700	896	238			
Volume to Capacity	0.41	0.01	0.24			
Queue Length 95th (m)	0.0	0.3	7.3			
Control Delay (s)	0.0	0.4	24.9			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.4	24.9			
Approach LOS			C			
Intersection Summary						
Average Delay		1.0				
Intersection Capacity Utilization		66.1%		ICU Level of Service		C
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	2	4	257	1	4	568
Future Volume (Veh/h)	2	4	257	1	4	568
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	4	279	1	4	617
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	904	280		280		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	904	280		280		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	99	99		100		
cM capacity (veh/h)	306	759		1283		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	6	280	621			
Volume Left	2	0	4			
Volume Right	4	1	0			
cSH	509	1700	1283			
Volume to Capacity	0.01	0.16	0.00			
Queue Length 95th (m)	0.3	0.0	0.1			
Control Delay (s)	12.2	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	12.2	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		43.1%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗	↑ ↗	↑ ↗	↑ ↗	↑ ↗
Traffic Volume (vph)	249	171	309	249	100
Future Volume (vph)	249	171	309	249	100
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			8	2	2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	23.0	11.0	34.0	26.0	26.0
Total Split (%)	38.3%	18.3%	56.7%	43.3%	43.3%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	18.0	28.5	29.0	22.0	22.0
Actuated g/C Ratio	0.30	0.48	0.49	0.37	0.37
v/c Ratio	0.90	0.61	0.37	0.43	0.17
Control Delay	38.8	19.0	10.7	16.9	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	19.0	10.7	16.9	4.0
LOS	D	B	B	B	A
Approach Delay	38.8		13.7	13.2	
Approach LOS	D		B	B	

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 59.1

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 22.7

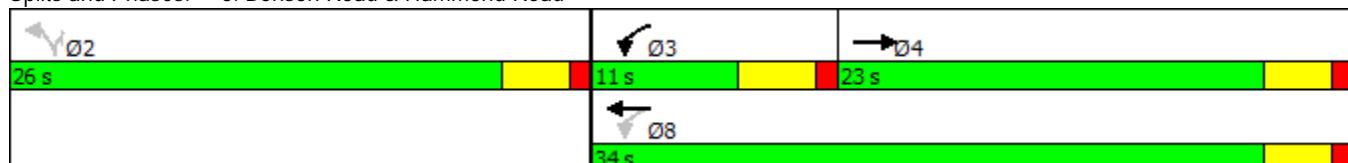
Intersection LOS: C

Intersection Capacity Utilization 60.7%

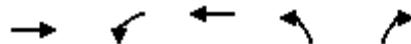
ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	518	186	336	271	109
V/c Ratio	0.90	0.61	0.37	0.43	0.17
Control Delay	38.8	19.0	10.7	16.9	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	19.0	10.7	16.9	4.0
Queue Length 50th (m)	47.5	11.4	21.9	23.0	0.0
Queue Length 95th (m)	#101.0	#26.9	37.8	41.5	8.4
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0		30.0	
Base Capacity (vph)	603	303	947	629	631
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	0.86	0.61	0.35	0.43	0.17

Intersection Summary

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

Queue shown is maximum after two cycles.

6: Bonson Road & Hammond Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↘	↙	↑ ↗	↑ ↘	↙	↑ ↗
Traffic Volume (vph)	249	227	171	309	249	100
Future Volume (vph)	249	227	171	309	249	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.5	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1703		1687	1863	1687	1509
Flt Permitted	1.00		0.18	1.00	0.95	1.00
Satd. Flow (perm)	1703		316	1863	1687	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	271	247	186	336	271	109
RTOR Reduction (vph)	56	0	0	0	0	68
Lane Group Flow (vph)	462	0	186	336	271	41
Heavy Vehicles (%)	2%	7%	7%	2%	7%	7%
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	4			3	8	
Permitted Phases				8		2
Actuated Green, G (s)	18.0		29.0	29.0	22.0	22.0
Effective Green, g (s)	18.0		29.0	29.0	22.0	22.0
Actuated g/C Ratio	0.31		0.49	0.49	0.37	0.37
Clearance Time (s)	4.0		4.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	519		306	915	629	562
v/s Ratio Prot	c0.27		c0.07	0.18		
v/s Ratio Perm			0.23		c0.16	0.03
v/c Ratio	0.89		0.61	0.37	0.43	0.07
Uniform Delay, d1	19.6		11.5	9.3	13.8	11.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	17.3		3.4	0.3	2.1	0.2
Delay (s)	36.8		14.8	9.6	16.0	12.2
Level of Service	D		B	A	B	B
Approach Delay (s)	36.8			11.4	14.9	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay		21.6		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.64				
Actuated Cycle Length (s)		59.0		Sum of lost time (s)		12.5
Intersection Capacity Utilization		60.7%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	75	84	133	248	326	62
Future Volume (Veh/h)	75	84	133	248	326	62
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	91	145	270	354	67
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	948	388	421			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	948	388	421			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	68	86	87			
cM capacity (veh/h)	253	661	1138			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	173	415	421			
Volume Left	82	145	0			
Volume Right	91	0	67			
cSH	374	1138	1700			
Volume to Capacity	0.46	0.13	0.25			
Queue Length 95th (m)	18.9	3.5	0.0			
Control Delay (s)	22.6	3.9	0.0			
Lane LOS	C	A				
Approach Delay (s)	22.6	3.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		5.5				
Intersection Capacity Utilization	60.6%		ICU Level of Service		B	
Analysis Period (min)		15				

8: Bonson Road & 116a Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	R	T		S	RT
Traffic Volume (veh/h)	11	50	332	7	25	384
Future Volume (Veh/h)	11	50	332	7	25	384
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	54	361	8	27	417
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	836	365			369	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	836	365			369	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	92			98	
cM capacity (veh/h)	330	680			1190	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	66	369	444			
Volume Left	12	0	27			
Volume Right	54	8	0			
cSH	570	1700	1190			
Volume to Capacity	0.12	0.22	0.02			
Queue Length 95th (m)	3.1	0.0	0.6			
Control Delay (s)	12.1	0.0	0.7			
Lane LOS	B		A			
Approach Delay (s)	12.1	0.0	0.7			
Approach LOS	B					
Intersection Summary						
Average Delay		1.3				
Intersection Capacity Utilization		51.1%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	93	0	0	178	108	26
Future Volume (Veh/h)	93	0	0	178	108	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	101	0	0	193	117	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	324	131	145			
vc1, stage 1 conf vol						
vc2, stage 2 conf vol						
vCu, unblocked vol	324	131	145			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	100	100			
cM capacity (veh/h)	670	919	1437			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	101	193	145			
Volume Left	101	0	0			
Volume Right	0	0	28			
cSH	670	1437	1700			
Volume to Capacity	0.15	0.00	0.09			
Queue Length 95th (m)	4.2	0.0	0.0			
Control Delay (s)	11.3	0.0	0.0			
Lane LOS	B					
Approach Delay (s)	11.3	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		21.2%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

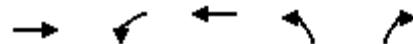
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	1140	10	52	866	7	20
Future Volume (Veh/h)	1140	10	52	866	7	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1239	11	57	941	8	22
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		1250		2300	1244	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		1250		2300	1244	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		90		79	90	
cM capacity (veh/h)		557		38	212	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1250	998	30			
Volume Left	0	57	8			
Volume Right	11	0	22			
cSH	1700	557	96			
Volume to Capacity	0.74	0.10	0.31			
Queue Length 95th (m)	0.0	2.7	9.5			
Control Delay (s)	0.0	3.3	58.8			
Lane LOS		A	F			
Approach Delay (s)	0.0	3.3	58.8			
Approach LOS		F				
Intersection Summary						
Average Delay		2.2				
Intersection Capacity Utilization		98.1%		ICU Level of Service		F
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	N	N	S	S
Traffic Volume (veh/h)	6	3	677	4	6	383
Future Volume (Veh/h)	6	3	677	4	6	383
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	3	736	4	7	416
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1168	738		740		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1168	738		740		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	97	99		99		
cM capacity (veh/h)	212	418		867		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	10	740	423			
Volume Left	7	0	7			
Volume Right	3	4	0			
cSH	249	1700	867			
Volume to Capacity	0.04	0.44	0.01			
Queue Length 95th (m)	1.0	0.0	0.2			
Control Delay (s)	20.1	0.0	0.2			
Lane LOS	C		A			
Approach Delay (s)	20.1	0.0	0.2			
Approach LOS	C					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		45.9%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑
Traffic Volume (vph)	431	139	349	258	218
Future Volume (vph)	431	139	349	258	218
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			8	2	2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	29.0	10.6	39.6	25.4	25.4
Total Split (%)	44.6%	16.3%	60.9%	39.1%	39.1%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	23.3	30.8	31.3	21.8	21.8
Actuated g/C Ratio	0.38	0.50	0.51	0.36	0.36
v/c Ratio	0.91	0.55	0.40	0.47	0.34
Control Delay	37.9	16.0	10.1	20.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	16.0	10.1	20.2	4.3
LOS	D	B	B	C	A
Approach Delay	37.9		11.8	12.9	
Approach LOS	D		B	B	

Intersection Summary

Cycle Length: 65

Actuated Cycle Length: 61.3

Natural Cycle: 65

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 22.0

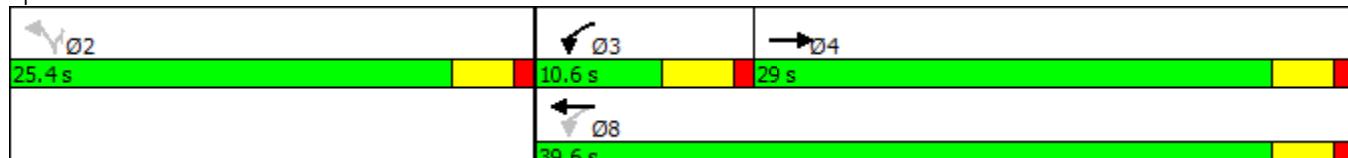
Intersection LOS: C

Intersection Capacity Utilization 64.3%

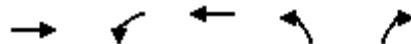
ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



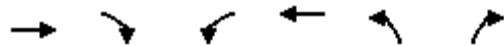
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	632	151	379	280	237
v/c Ratio	0.91	0.55	0.40	0.47	0.34
Control Delay	37.9	16.0	10.1	20.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	16.0	10.1	20.2	4.3
Queue Length 50th (m)	69.7	8.8	24.8	28.0	0.0
Queue Length 95th (m)	#132.7	18.3	41.2	49.3	13.5
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0			30.0
Base Capacity (vph)	756	273	1102	600	689
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	0.84	0.55	0.34	0.47	0.34

Intersection Summary

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

Queue shown is maximum after two cycles.

6: Bonson Road & Hammond Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↘	↓ ↗	↑ ↙	↑ ↖	↑ ↙	↑ ↖
Traffic Volume (vph)	431	151	139	349	258	218
Future Volume (vph)	431	151	139	349	258	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.5	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1775		1687	1863	1687	1509
Flt Permitted	1.00		0.14	1.00	0.95	1.00
Satd. Flow (perm)	1775		255	1863	1687	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	468	164	151	379	280	237
RTOR Reduction (vph)	20	0	0	0	0	154
Lane Group Flow (vph)	612	0	151	379	280	83
Heavy Vehicles (%)	2%	7%	7%	2%	7%	7%
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	4			3	8	
Permitted Phases				8		2
Actuated Green, G (s)	23.3		32.4	32.4	21.8	21.8
Effective Green, g (s)	23.3		32.4	32.4	21.8	21.8
Actuated g/C Ratio	0.37		0.52	0.52	0.35	0.35
Clearance Time (s)	4.0		4.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	664		238	970	591	528
v/s Ratio Prot	c0.34		c0.05	0.20		
v/s Ratio Perm			0.28		c0.17	0.06
v/c Ratio	0.92		0.63	0.39	0.47	0.16
Uniform Delay, d1	18.6		12.1	9.0	15.7	13.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	18.3		5.4	0.3	2.7	0.6
Delay (s)	36.9		17.6	9.2	18.4	14.5
Level of Service	D		B	A	B	B
Approach Delay (s)	36.9			11.6	16.6	
Approach LOS	D			B	B	
Intersection Summary						
HCM 2000 Control Delay		22.7		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.70				
Actuated Cycle Length (s)		62.2		Sum of lost time (s)		12.5
Intersection Capacity Utilization		64.3%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	42	69	451	274	31
Future Volume (Veh/h)	35	42	69	451	274	31
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	38	46	75	490	298	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	955	315	332			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	955	315	332			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	86	94	94			
cM capacity (veh/h)	269	725	1227			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	84	565	332			
Volume Left	38	75	0			
Volume Right	46	0	34			
cSH	411	1227	1700			
Volume to Capacity	0.20	0.06	0.20			
Queue Length 95th (m)	6.1	1.6	0.0			
Control Delay (s)	16.0	1.7	0.0			
Lane LOS	C	A				
Approach Delay (s)	16.0	1.7	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		58.4%		ICU Level of Service		B
Analysis Period (min)		15				

8: Bonson Road & 116a Ave

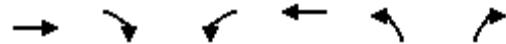


Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	26	494	20	32	284
Future Volume (Veh/h)	11	26	494	20	32	284
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	28	537	22	35	309
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	927	548			559	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	927	548			559	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	95			97	
cM capacity (veh/h)	288	536			1012	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	40	559	344			
Volume Left	12	0	35			
Volume Right	28	22	0			
cSH	426	1700	1012			
Volume to Capacity	0.09	0.33	0.03			
Queue Length 95th (m)	2.5	0.0	0.9			
Control Delay (s)	14.3	0.0	1.2			
Lane LOS	B		A			
Approach Delay (s)	14.3	0.0	1.2			
Approach LOS	B					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		51.7%		ICU Level of Service		A
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	1	2	133	179	100
Future Volume (Veh/h)	43	1	2	133	179	100
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	1	2	145	195	109
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	398	250	304			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	250	304			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	100	100			
cM capacity (veh/h)	606	789	1257			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	48	147	304			
Volume Left	47	2	0			
Volume Right	1	0	109			
cSH	609	1257	1700			
Volume to Capacity	0.08	0.00	0.18			
Queue Length 95th (m)	2.0	0.0	0.0			
Control Delay (s)	11.4	0.1	0.0			
Lane LOS	B	A				
Approach Delay (s)	11.4	0.1	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.1				
Intersection Capacity Utilization		25.5%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

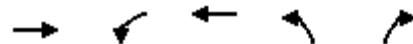
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗			↖ ↗	↖ ↗	
Traffic Volume (veh/h)	770	8	12	1177	16	47
Future Volume (Veh/h)	770	8	12	1177	16	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	837	9	13	1279	17	51
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		846		2146	842	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		846		2146	842	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		98		68	86	
cM capacity (veh/h)		791		52	364	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	846	1292	68			
Volume Left	0	13	17			
Volume Right	9	0	51			
cSH	1700	791	146			
Volume to Capacity	0.50	0.02	0.46			
Queue Length 95th (m)	0.0	0.4	17.1			
Control Delay (s)	0.0	0.7	49.3			
Lane LOS		A	E			
Approach Delay (s)	0.0	0.7	49.3			
Approach LOS			E			
Intersection Summary						
Average Delay		1.9				
Intersection Capacity Utilization		82.0%		ICU Level of Service		D
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	5	313	1	5	736
Future Volume (Veh/h)	3	5	313	1	5	736
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	5	340	1	5	800
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1150	340		341		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1150	340		341		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	99	99		100		
cM capacity (veh/h)	218	702		1218		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	8	341	805			
Volume Left	3	0	5			
Volume Right	5	1	0			
cSH	383	1700	1218			
Volume to Capacity	0.02	0.20	0.00			
Queue Length 95th (m)	0.5	0.0	0.1			
Control Delay (s)	14.6	0.0	0.1			
Lane LOS	B		A			
Approach Delay (s)	14.6	0.0	0.1			
Approach LOS	B					
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		52.7%		ICU Level of Service		A
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑
Traffic Volume (vph)	293	225	365	302	125
Future Volume (vph)	293	225	365	302	125
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			8	2	2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	29.0	14.0	43.0	27.0	27.0
Total Split (%)	41.4%	20.0%	61.4%	38.6%	38.6%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	25.0	38.2	38.7	23.0	23.0
Actuated g/C Ratio	0.36	0.55	0.56	0.33	0.33
v/c Ratio	0.96	0.76	0.38	0.59	0.23
Control Delay	49.5	29.2	10.1	24.7	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	29.2	10.1	24.7	4.7
LOS	D	C	B	C	A
Approach Delay	49.5		17.4	18.9	
Approach LOS	D		B	B	

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 69.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 29.5

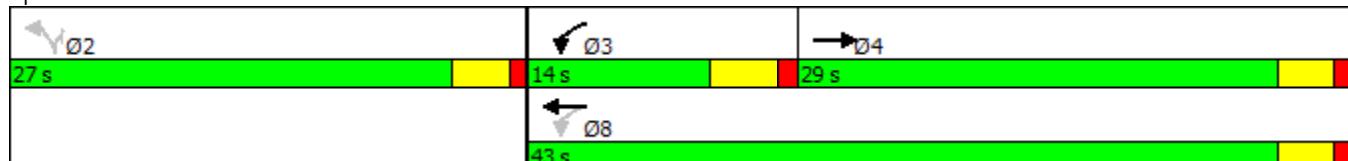
Intersection LOS: C

Intersection Capacity Utilization 72.8%

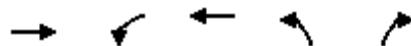
ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



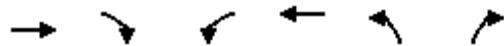
Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	634	245	397	328	136
V/c Ratio	0.96	0.76	0.38	0.59	0.23
Control Delay	49.5	29.2	10.1	24.7	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	29.2	10.1	24.7	4.7
Queue Length 50th (m)	75.3	16.6	28.0	37.1	0.0
Queue Length 95th (m)	#143.3	#50.3	45.6	62.6	10.9
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0		30.0	
Base Capacity (vph)	659	328	1042	557	589
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	0.96	0.75	0.38	0.59	0.23

Intersection Summary

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

Queue shown is maximum after two cycles.

6: Bonson Road & Hammond Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗	↗	↖	↑ ↙	↖	↖
Traffic Volume (vph)	293	291	225	365	302	125
Future Volume (vph)	293	291	225	365	302	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.5	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1696		1687	1863	1687	1509
Flt Permitted	1.00		0.14	1.00	0.95	1.00
Satd. Flow (perm)	1696		241	1863	1687	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	318	316	245	397	328	136
RTOR Reduction (vph)	51	0	0	0	0	91
Lane Group Flow (vph)	583	0	245	397	328	45
Heavy Vehicles (%)	2%	7%	7%	2%	7%	7%
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	4			3	8	
Permitted Phases				8		2
Actuated Green, G (s)	25.0		38.7	38.7	23.0	23.0
Effective Green, g (s)	25.0		38.7	38.7	23.0	23.0
Actuated g/C Ratio	0.36		0.56	0.56	0.33	0.33
Clearance Time (s)	4.0		4.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	608		324	1034	556	497
v/s Ratio Prot	c0.34		c0.10	0.21		
v/s Ratio Perm			0.32		c0.19	0.03
v/c Ratio	0.96		0.76	0.38	0.59	0.09
Uniform Delay, d1	21.9		13.6	8.8	19.4	16.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	26.4		9.7	0.2	4.5	0.4
Delay (s)	48.2		23.3	9.0	24.0	16.5
Level of Service	D		C	A	C	B
Approach Delay (s)	48.2			14.4	21.8	
Approach LOS	D			B	C	
Intersection Summary						
HCM 2000 Control Delay		28.7		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.78				
Actuated Cycle Length (s)		69.7		Sum of lost time (s)		12.5
Intersection Capacity Utilization		72.8%		ICU Level of Service		C
Analysis Period (min)		15				
c Critical Lane Group						

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	88	99	157	309	430	73
Future Volume (Veh/h)	88	99	157	309	430	73
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	96	108	171	336	467	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	1184	506	546			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1184	506	546			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	45	81	83			
cM capacity (veh/h)	174	566	1023			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	204	507	546			
Volume Left	96	171	0			
Volume Right	108	0	79			
cSH	275	1023	1700			
Volume to Capacity	0.74	0.17	0.32			
Queue Length 95th (m)	43.0	4.8	0.0			
Control Delay (s)	48.1	4.4	0.0			
Lane LOS	E	A				
Approach Delay (s)	48.1	4.4	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay		9.6				
Intersection Capacity Utilization		73.0%		ICU Level of Service		C
Analysis Period (min)		15				

8: Bonson Road & 116a Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	59	408	8	30	499
Future Volume (Veh/h)	13	59	408	8	30	499
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	64	443	9	33	542
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	1056	448			452	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1056	448			452	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	90			97	
cM capacity (veh/h)	242	611			1109	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	78	452	575			
Volume Left	14	0	33			
Volume Right	64	9	0			
cSH	480	1700	1109			
Volume to Capacity	0.16	0.27	0.03			
Queue Length 95th (m)	4.6	0.0	0.7			
Control Delay (s)	14.0	0.0	0.8			
Lane LOS	B		A			
Approach Delay (s)	14.0	0.0	0.8			
Approach LOS	B					
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization		61.8%		ICU Level of Service		B
Analysis Period (min)			15			

9: Bonson Road & Sutton Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	123	10	13	211	127	58
Future Volume (Veh/h)	123	10	13	211	127	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	134	11	14	229	138	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	426	170	201			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	426	170	201			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	99	99			
cM capacity (veh/h)	579	874	1371			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	145	243	201			
Volume Left	134	14	0			
Volume Right	11	0	63			
cSH	594	1371	1700			
Volume to Capacity	0.24	0.01	0.12			
Queue Length 95th (m)	7.6	0.2	0.0			
Control Delay (s)	13.0	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	13.0	0.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		3.4				
Intersection Capacity Utilization		35.8%		ICU Level of Service		A
Analysis Period (min)		15				

4: Southgate Road & Airport Way

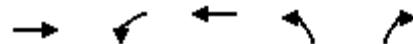
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	↑	
Traffic Volume (veh/h)	1511	12	61	1062	8	23
Future Volume (Veh/h)	1511	12	61	1062	8	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1642	13	66	1154	9	25
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume		1655		2934	1648	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol		1655		2934	1648	
tC, single (s)		4.1		6.4	6.2	
tC, 2 stage (s)						
tF (s)		2.2		3.5	3.3	
p0 queue free %		83		35	80	
cM capacity (veh/h)		390		14	122	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	1655	1220	34			
Volume Left	0	66	9			
Volume Right	13	0	25			
cSH	1700	390	40			
Volume to Capacity	0.97	0.17	0.86			
Queue Length 95th (m)	0.0	4.8	25.9			
Control Delay (s)	0.0	8.9	253.4			
Lane LOS		A	F			
Approach Delay (s)	0.0	8.9	253.4			
Approach LOS		F				
Intersection Summary						
Average Delay		6.7				
Intersection Capacity Utilization		115.7%		ICU Level of Service		H
Analysis Period (min)		15				

5: Harris Road & Fieldstone Walk



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	4	869	5	7	478
Future Volume (Veh/h)	7	4	869	5	7	478
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	4	945	5	8	520
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1484	948		950		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1484	948		950		
tC, single (s)	6.4	6.2		4.1		
tC, 2 stage (s)						
tF (s)	3.5	3.3		2.2		
p0 queue free %	94	99		99		
cM capacity (veh/h)	136	316		723		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	12	950	528			
Volume Left	8	0	8			
Volume Right	4	5	0			
cSH	168	1700	723			
Volume to Capacity	0.07	0.56	0.01			
Queue Length 95th (m)	1.8	0.0	0.3			
Control Delay (s)	28.1	0.0	0.3			
Lane LOS	D		A			
Approach Delay (s)	28.1	0.0	0.3			
Approach LOS	D					
Intersection Summary						
Average Delay		0.3				
Intersection Capacity Utilization		56.0%		ICU Level of Service		B
Analysis Period (min)		15				

6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑
Traffic Volume (vph)	510	173	412	336	289
Future Volume (vph)	510	173	412	336	289
Turn Type	NA	pm+pt	NA	Perm	Perm
Protected Phases	4	3	8		
Permitted Phases			8	2	2
Detector Phase	4	3	8	2	2
Switch Phase					
Minimum Initial (s)	7.0	6.0	7.0	7.0	7.0
Minimum Split (s)	23.0	10.5	23.0	25.0	25.0
Total Split (s)	37.0	11.3	48.3	26.7	26.7
Total Split (%)	49.3%	15.1%	64.4%	35.6%	35.6%
Yellow Time (s)	3.0	3.5	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.5	4.0	4.0	4.0
Lead/Lag	Lag	Lead			
Lead-Lag Optimize?	Yes	Yes			
Recall Mode	None	None	None	Max	Max
Act Effect Green (s)	32.2	43.0	43.5	22.7	22.7
Actuated g/C Ratio	0.43	0.58	0.59	0.31	0.31
v/c Ratio	0.96	0.76	0.41	0.71	0.48
Control Delay	45.9	32.9	9.7	32.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	32.9	9.7	32.2	6.7
LOS	D	C	A	C	A
Approach Delay	45.9		16.6	20.4	
Approach LOS	D		B	C	

Intersection Summary

Cycle Length: 75

Actuated Cycle Length: 74.2

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 28.5

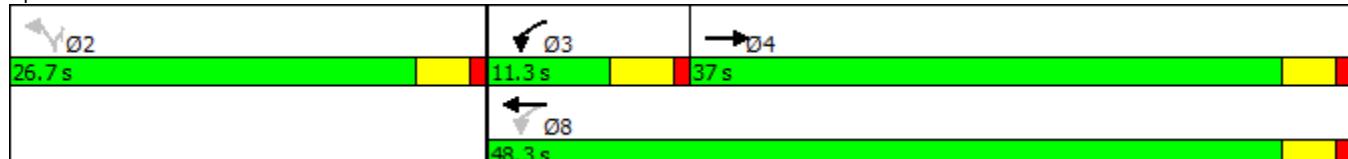
Intersection LOS: C

Intersection Capacity Utilization 76.8%

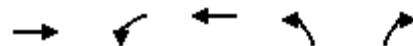
ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 6: Bonson Road & Hammond Road



6: Bonson Road & Hammond Road



Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Group Flow (vph)	757	188	448	365	314
v/c Ratio	0.96	0.76	0.41	0.71	0.48
Control Delay	45.9	32.9	9.7	32.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	45.9	32.9	9.7	32.2	6.7
Queue Length 50th (m)	100.8	11.9	32.4	48.0	3.5
Queue Length 95th (m)	#177.2	#43.2	51.1	#81.7	21.8
Internal Link Dist (m)	590.3		516.9	287.1	
Turn Bay Length (m)		40.0			30.0
Base Capacity (vph)	805	249	1112	515	656
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.94	0.76	0.40	0.71	0.48

Intersection Summary

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

Queue shown is maximum after two cycles.

6: Bonson Road & Hammond Road



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑ ↗	↗	↖	↑ ↘	↖	↖
Traffic Volume (vph)	510	187	173	412	336	289
Future Volume (vph)	510	187	173	412	336	289
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.5	4.0	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1772		1687	1863	1687	1509
Flt Permitted	1.00		0.11	1.00	0.95	1.00
Satd. Flow (perm)	1772		194	1863	1687	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	203	188	448	365	314
RTOR Reduction (vph)	18	0	0	0	0	195
Lane Group Flow (vph)	739	0	188	448	365	119
Heavy Vehicles (%)	2%	7%	7%	2%	7%	7%
Turn Type	NA		pm+pt	NA	Perm	Perm
Protected Phases	4			3	8	
Permitted Phases				8		2
Actuated Green, G (s)	32.2		43.5	43.5	22.7	22.7
Effective Green, g (s)	32.2		43.5	43.5	22.7	22.7
Actuated g/C Ratio	0.43		0.59	0.59	0.31	0.31
Clearance Time (s)	4.0		4.5	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	768		250	1092	516	461
v/s Ratio Prot	c0.42		c0.07	0.24		
v/s Ratio Perm			0.37		c0.22	0.08
v/c Ratio	0.96		0.75	0.41	0.71	0.26
Uniform Delay, d1	20.4		14.8	8.4	22.8	19.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	23.6		12.0	0.3	8.0	1.4
Delay (s)	44.0		26.8	8.6	30.8	20.8
Level of Service	D		C	A	C	C
Approach Delay (s)	44.0			14.0	26.1	
Approach LOS	D			B	C	
Intersection Summary						
HCM 2000 Control Delay		28.9		HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio		0.85				
Actuated Cycle Length (s)		74.2		Sum of lost time (s)		12.5
Intersection Capacity Utilization		76.8%		ICU Level of Service		D
Analysis Period (min)		15				
c Critical Lane Group						

7: Bonson Road & 116b Ave



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	49	82	595	342	36
Future Volume (Veh/h)	42	49	82	595	342	36
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	53	89	647	372	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				311		
pX, platoon unblocked						
vC, conflicting volume	1216	392	411			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1216	392	411			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	92	92			
cM capacity (veh/h)	184	657	1148			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	99	736	411			
Volume Left	46	89	0			
Volume Right	53	0	39			
cSH	300	1148	1700			
Volume to Capacity	0.33	0.08	0.24			
Queue Length 95th (m)	11.2	2.0	0.0			
Control Delay (s)	22.8	1.9	0.0			
Lane LOS	C	A				
Approach Delay (s)	22.8	1.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		71.4%		ICU Level of Service		C
Analysis Period (min)		15				

8: Bonson Road & 116a Ave



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	13	31	645	23	38	354
Future Volume (Veh/h)	13	31	645	23	38	354
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	34	701	25	41	385
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						362
pX, platoon unblocked						
vC, conflicting volume	1180	714			726	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1180	714			726	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	92			95	
cM capacity (veh/h)	200	432			877	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	48	726	426			
Volume Left	14	0	41			
Volume Right	34	25	0			
cSH	323	1700	877			
Volume to Capacity	0.15	0.43	0.05			
Queue Length 95th (m)	4.1	0.0	1.2			
Control Delay (s)	18.1	0.0	1.4			
Lane LOS	C		A			
Approach Delay (s)	18.1	0.0	1.4			
Approach LOS	C					
Intersection Summary						
Average Delay		1.2				
Intersection Capacity Utilization		60.3%		ICU Level of Service		B
Analysis Period (min)		15				

9: Bonson Road & Sutton Ave

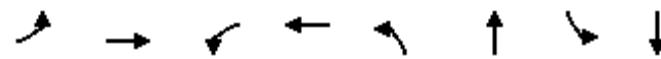


Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	9	9	157	212	120
Future Volume (Veh/h)	64	9	9	157	212	120
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	10	10	171	230	130
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	295	360			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	295	360			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	99	99			
cM capacity (veh/h)	536	744	1199			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	80	181	360			
Volume Left	70	10	0			
Volume Right	10	0	130			
cSH	555	1199	1700			
Volume to Capacity	0.14	0.01	0.21			
Queue Length 95th (m)	4.0	0.2	0.0			
Control Delay (s)	12.6	0.5	0.0			
Lane LOS	B	A				
Approach Delay (s)	12.6	0.5	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay		1.8				
Intersection Capacity Utilization		29.2%		ICU Level of Service		A
Analysis Period (min)		15				

2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2021 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑ ↗	↗ ↘	↑ ↗	↗ ↘	↔	↔	↑ ↗	↗ ↘
Traffic Volume (vph)	42	119	128	486	35	82	221	108
Future Volume (vph)	42	119	128	486	35	82	221	108
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases				4		8		2
Permitted Phases					2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	6.0	6.0	6.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	25.6	25.6	25.6	25.6		14.9	14.9	14.9
Actuated g/C Ratio	0.50	0.50	0.50	0.50		0.29	0.29	0.29
v/c Ratio	0.28	0.16	0.23	0.86		0.38	0.66	0.59
Control Delay	13.7	7.6	9.3	23.8		15.3	26.2	12.6
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	13.7	7.6	9.3	23.8		15.3	26.2	12.6
LOS	B	A	A	C		B	C	B
Approach Delay		9.1		21.5		15.3		18.2
Approach LOS		A		C		B		B

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 51

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 18.6

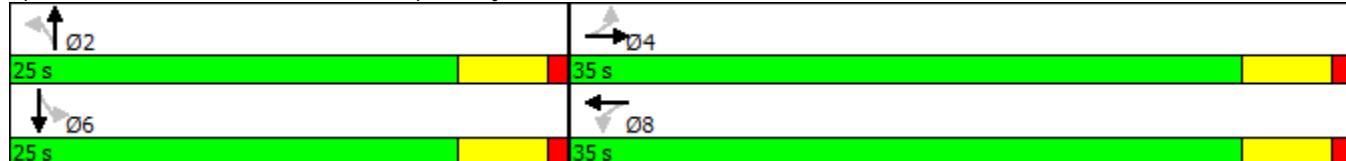
Intersection LOS: B

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

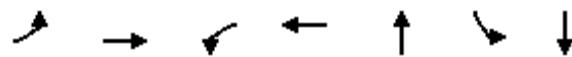
Splits and Phases: 2: Harris Road & Airport Way



2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2021 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	46	143	139	753	173	240	346
V/c Ratio	0.28	0.16	0.23	0.86	0.38	0.66	0.59
Control Delay	13.7	7.6	9.3	23.8	15.3	26.2	12.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	7.6	9.3	23.8	15.3	26.2	12.6
Queue Length 50th (m)	2.4	6.3	7.0	55.1	11.7	22.4	14.4
Queue Length 95th (m)	9.9	15.8	17.8	#136.2	25.6	43.3	35.8
Internal Link Dist (m)		764.8		789.1	246.8		443.0
Turn Bay Length (m)	40.0		40.0				
Base Capacity (vph)	206	1088	732	1070	625	518	763
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.13	0.19	0.70	0.28	0.46	0.45

Intersection Summary

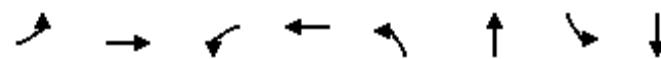
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2021 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑ ↗	↗ ↘	↑ ↗	↗ ↘	↗ ↗	↖ ↗	↑ ↗	↗ ↘
Traffic Volume (vph)	48	282	84	725	54	117	166	49
Future Volume (vph)	48	282	84	725	54	117	166	49
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases				4		8		2
Permitted Phases					2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	39.0	39.0	39.0	39.0	31.0	31.0	31.0	31.0
Total Split (%)	55.7%	55.7%	55.7%	55.7%	44.3%	44.3%	44.3%	44.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	34.4	34.4	34.4	34.4		17.5	17.5	17.5
Actuated g/C Ratio	0.55	0.55	0.55	0.55		0.28	0.28	0.28
v/c Ratio	0.45	0.33	0.17	0.95		0.74	0.84	0.43
Control Delay	28.7	10.0	9.8	36.3		25.5	52.5	10.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	28.7	10.0	9.8	36.3		25.5	52.5	10.7
LOS	C	B	A	D		C	D	B
Approach Delay		12.6		34.0		25.5		28.7
Approach LOS		B		C		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 62

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 27.8

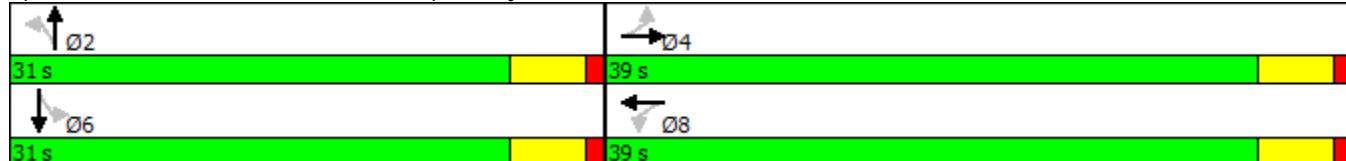
Intersection LOS: C

Intersection Capacity Utilization 102.1%

ICU Level of Service G

Analysis Period (min) 15

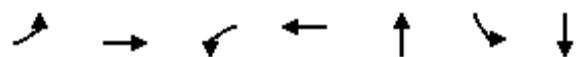
Splits and Phases: 3: Bonson Road & Airport Way



3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2021 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	52	322	91	918	353	180	238
V/c Ratio	0.45	0.33	0.17	0.95	0.74	0.84	0.43
Control Delay	28.7	10.0	9.8	36.3	25.5	52.5	10.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.7	10.0	9.8	36.3	25.5	52.5	10.7
Queue Length 50th (m)	3.4	18.9	4.9	93.2	29.7	20.0	10.0
Queue Length 95th (m)	#21.3	43.6	15.1	#213.2	56.0	#47.8	25.3
Internal Link Dist (m)		789.1		350.3	253.5		183.5
Turn Bay Length (m)	40.0		40.0			40.0	
Base Capacity (vph)	115	979	540	970	677	321	763
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.33	0.17	0.95	0.52	0.56	0.31

Intersection Summary

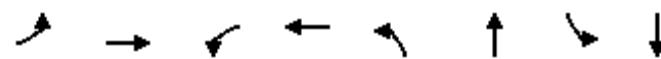
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2021 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↓	↑	↓			↑	↓
Traffic Volume (vph)	261	609	63	189	13	134	256	106
Future Volume (vph)	261	609	63	189	13	134	256	106
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	7	4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	7	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	6.0	10.0	10.0	10.0	7.0	7.0	6.0	7.0
Minimum Split (s)	11.0	23.0	23.0	23.0	23.0	23.0	11.0	23.0
Total Split (s)	17.0	49.0	32.0	32.0	26.0	26.0	15.0	41.0
Total Split (%)	18.9%	54.4%	35.6%	35.6%	28.9%	28.9%	16.7%	45.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead		Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	None	Min
Act Effect Green (s)	43.2	43.2	26.1	26.1		18.5	33.6	33.6
Actuated g/C Ratio	0.50	0.50	0.30	0.30		0.21	0.39	0.39
v/c Ratio	0.90	0.82	0.44	0.95		0.85	0.93	0.28
Control Delay	53.3	28.3	35.9	54.4		48.6	60.6	15.2
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	53.3	28.3	35.9	54.4		48.6	60.6	15.2
LOS	D	C	D	D		D	E	B
Approach Delay		35.4		52.2		48.6		42.2
Approach LOS		D		D		D		D

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 86.8

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 42.7

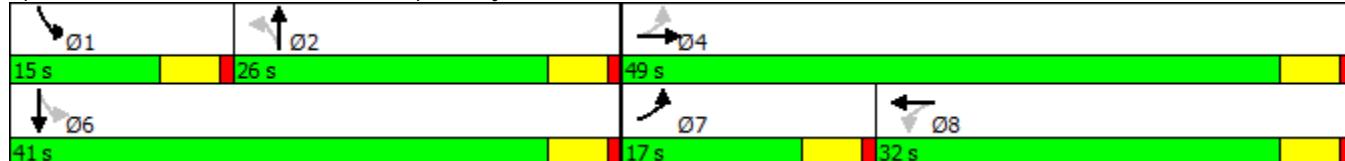
Intersection LOS: D

Intersection Capacity Utilization 91.6%

ICU Level of Service F

Analysis Period (min) 15

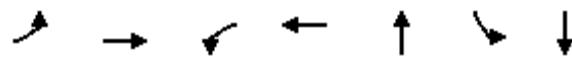
Splits and Phases: 2: Harris Road & Airport Way



2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2021 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	284	715	68	518	332	278	189
V/c Ratio	0.90	0.82	0.44	0.95	0.85	0.93	0.28
Control Delay	53.3	28.3	35.9	54.4	48.6	60.6	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	28.3	35.9	54.4	48.6	60.6	15.2
Queue Length 50th (m)	35.3	106.3	9.9	78.7	47.7	35.6	17.1
Queue Length 95th (m)	#84.3	#176.8	24.1	#144.8	#91.0	#76.6	32.6
Internal Link Dist (m)		764.8		789.1	246.8		443.0
Turn Bay Length (m)	40.0		40.0			40.0	
Base Capacity (vph)	315	896	161	563	436	300	720
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.80	0.42	0.92	0.76	0.93	0.26

Intersection Summary

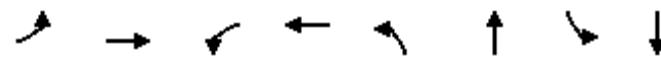
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2021 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↓	↑	↓		↔	↑	↓
Traffic Volume (vph)	228	914	178	422	28	57	63	64
Future Volume (vph)	228	914	178	422	28	57	63	64
Turn Type	Perm	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases					4	3	8	2
Permitted Phases					4	8	2	6
Detector Phase					4	4	3	8
Switch Phase								
Minimum Initial (s)	10.0	10.0	6.0	10.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	11.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	54.0	54.0	12.0	66.0	24.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	13.3%	73.3%	26.7%	26.7%	26.7%	26.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead					
Lead-Lag Optimize?	Yes	Yes	Yes					
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	49.1	49.1	61.2	61.2		13.2	13.2	13.2
Actuated g/C Ratio	0.58	0.58	0.73	0.73		0.16	0.16	0.16
v/c Ratio	0.61	1.02	0.86	0.58		0.72	0.63	0.48
Control Delay	20.9	54.3	52.9	7.9		37.1	58.6	25.7
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	20.9	54.3	52.9	7.9		37.1	58.6	25.7
LOS	C	D	D	A		D	E	C
Approach Delay		47.9		17.4		37.1		36.3
Approach LOS		D		B		D		D

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 84.4

Natural Cycle: 90

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 1.02

Intersection Signal Delay: 35.6

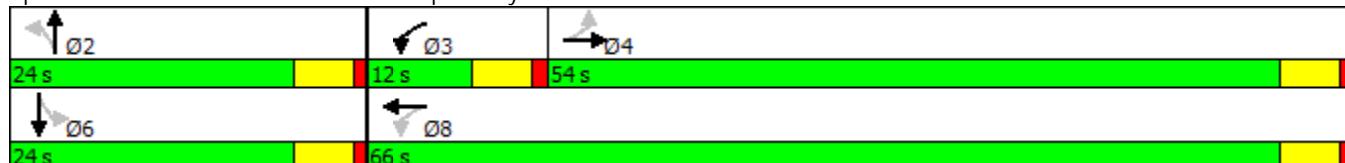
Intersection LOS: D

Intersection Capacity Utilization 96.6%

ICU Level of Service F

Analysis Period (min) 15

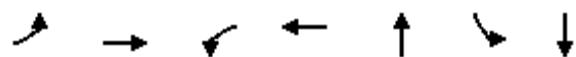
Splits and Phases: 3: Bonson Road & Airport Way



3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2021 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	248	1050	193	717	213	68	143
V/c Ratio	0.61	1.02	0.86	0.58	0.72	0.63	0.48
Control Delay	20.9	54.3	52.9	7.9	37.1	58.6	25.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	54.3	52.9	7.9	37.1	58.6	25.7
Queue Length 50th (m)	25.3	~192.6	16.9	42.3	23.5	10.9	13.8
Queue Length 95th (m)	61.7	#295.6	#61.3	88.6	47.2	25.1	30.8
Internal Link Dist (m)		789.1		350.3	253.5		183.5
Turn Bay Length (m)	40.0		40.0			40.0	
Base Capacity (vph)	406	1027	224	1237	396	156	410
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	1.02	0.86	0.58	0.54	0.44	0.35

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2031 AM Peak Combined

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑ ↗	↑ ↖	↑ ↗	↑ ↖	↑ ↗	↑ ↖	↑ ↗	↑ ↖	↑ ↗
Traffic Volume (vph)	43	126	200	511	36	105	63	320	151
Future Volume (vph)	43	126	200	511	36	105	63	320	151
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases	4			8		2		2	6
Detector Phase	7	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	10.0	6.0	10.0	7.0	7.0	7.0	6.0	7.0
Minimum Split (s)	11.0	23.0	11.0	23.0	23.0	23.0	23.0	11.0	23.0
Total Split (s)	11.0	24.0	11.0	24.0	23.0	23.0	23.0	12.0	35.0
Total Split (%)	15.7%	34.3%	15.7%	34.3%	32.9%	32.9%	32.9%	17.1%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes								
Recall Mode	None	None	None	None	Min	Min	Min	None	Min
Act Effect Green (s)	20.3	15.8	21.5	18.3		11.6	11.6	24.0	24.0
Actuated g/C Ratio	0.35	0.27	0.37	0.31		0.20	0.20	0.41	0.41
v/c Ratio	0.17	0.17	0.47	0.79		0.54	0.15	0.78	0.54
Control Delay	12.3	17.0	16.5	23.4		30.4	0.7	30.7	12.8
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	12.3	17.0	16.5	23.4		30.4	0.7	30.7	12.8
LOS	B	B	B	C		C	A	C	B
Approach Delay		15.9		22.0		21.3			21.1
Approach LOS		B		C		C			C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 58.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 21.1

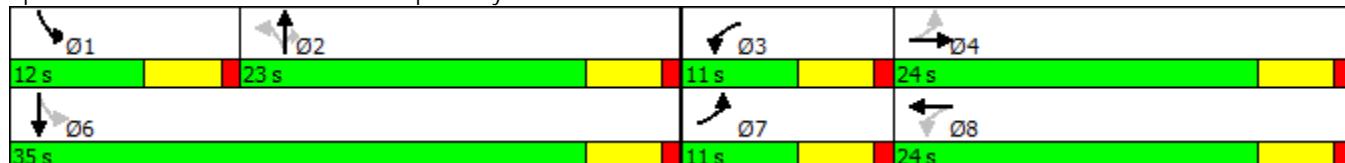
Intersection LOS: C

Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

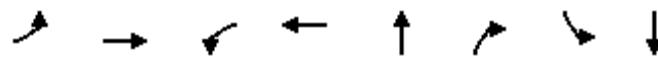
Splits and Phases: 2: Harris Road & Airport Way



2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2031 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	47	152	217	877	153	68	348	403
v/c Ratio	0.17	0.17	0.47	0.79	0.54	0.15	0.78	0.54
Control Delay	12.3	17.0	16.5	23.4	30.4	0.7	30.7	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	17.0	16.5	23.4	30.4	0.7	30.7	12.8
Queue Length 50th (m)	3.0	6.4	15.4	43.1	17.5	0.0	33.1	25.0
Queue Length 95th (m)	9.2	14.2	33.1	#84.5	33.9	0.0	#69.9	49.7
Internal Link Dist (m)		764.8		789.1	246.8			443.0
Turn Bay Length (m)	40.0		40.0			40.0	40.0	
Base Capacity (vph)	279	1128	460	1204	454	608	445	921
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	0.17	0.13	0.47	0.73	0.34	0.11	0.78	0.44

Intersection Summary

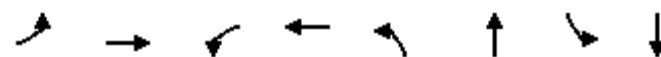
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2031 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓		↔	↑	↓
Traffic Volume (vph)	61	350	101	951	65	150	196	75
Future Volume (vph)	61	350	101	951	65	150	196	75
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases				4		8		2
Permitted Phases		4				2		6
Detector Phase		4		8		8		2
Switch Phase							6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0
Minimum Split (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	31.0	31.0	31.0	31.0	29.0	29.0	29.0	29.0
Total Split (%)	51.7%	51.7%	51.7%	51.7%	48.3%	48.3%	48.3%	48.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	22.5	22.5	22.5	22.5		18.1	18.1	18.1
Actuated g/C Ratio	0.44	0.44	0.44	0.44		0.35	0.35	0.35
v/c Ratio	0.47	0.28	0.27	0.80		0.75	0.76	0.57
Control Delay	26.7	10.1	12.7	18.2		21.1	35.5	16.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	26.7	10.1	12.7	18.2		21.1	35.5	16.0
LOS	C	B	B	B		C	D	B
Approach Delay		12.4		17.8		21.1		23.6
Approach LOS		B		B		C		C

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 51.1

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.80

Intersection Signal Delay: 18.5

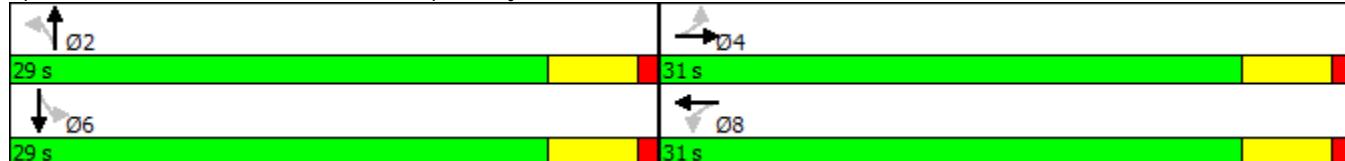
Intersection LOS: B

Intersection Capacity Utilization 96.4%

ICU Level of Service F

Analysis Period (min) 15

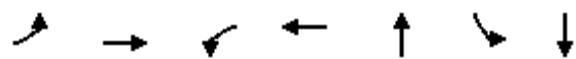
Splits and Phases: 3: Bonson Road & Airport Way



3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2031 AM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	66	407	110	1188	431	213	331
v/c Ratio	0.47	0.28	0.27	0.80	0.75	0.76	0.57
Control Delay	26.7	10.1	12.7	18.2	21.1	35.5	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	10.1	12.7	18.2	21.1	35.5	16.0
Queue Length 50th (m)	4.5	12.6	6.8	51.1	31.2	19.4	23.5
Queue Length 95th (m)	#21.1	23.1	18.1	#84.8	61.0	#50.0	44.8
Internal Link Dist (m)		789.1		350.3	253.5		183.5
Turn Bay Length (m)	40.0		40.0			40.0	
Base Capacity (vph)	168	1792	487	1786	770	390	799
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.23	0.23	0.67	0.56	0.55	0.41

Intersection Summary

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

Queue shown is maximum after two cycles.

2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2031 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓		↑	↑	↑	↑
Traffic Volume (vph)	268	633	106	200	14	196	268	375	140
Future Volume (vph)	268	633	106	200	14	196	268	375	140
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases	7	4	3	8		2		1	6
Permitted Phases	4			8		2		2	6
Detector Phase	7	4	3	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	6.0	10.0	6.0	10.0	7.0	7.0	7.0	6.0	7.0
Minimum Split (s)	11.0	23.0	11.0	23.0	23.0	23.0	23.0	11.0	23.0
Total Split (s)	16.0	28.0	11.0	23.0	24.0	24.0	24.0	17.0	41.0
Total Split (%)	20.0%	35.0%	13.8%	28.8%	30.0%	30.0%	30.0%	21.3%	51.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag	Lag	Lag	Lag	Lead	
Lead-Lag Optimize?	Yes								
Recall Mode	None	None	None	None	Min	Min	Min	None	Min
Act Effect Green (s)	31.2	22.7	21.1	15.1		14.3	14.3	31.5	31.5
Actuated g/C Ratio	0.43	0.31	0.29	0.21		0.20	0.20	0.43	0.43
v/c Ratio	0.83	0.71	0.45	0.67		0.67	0.59	0.92	0.30
Control Delay	39.0	27.8	20.7	12.6		38.1	11.2	47.5	12.5
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	39.0	27.8	20.7	12.6		38.1	11.2	47.5	12.5
LOS	D	C	C	B		D	B	D	B
Approach Delay		31.0		13.8		23.0			35.0
Approach LOS		C		B		C			D

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 72.8

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 26.0

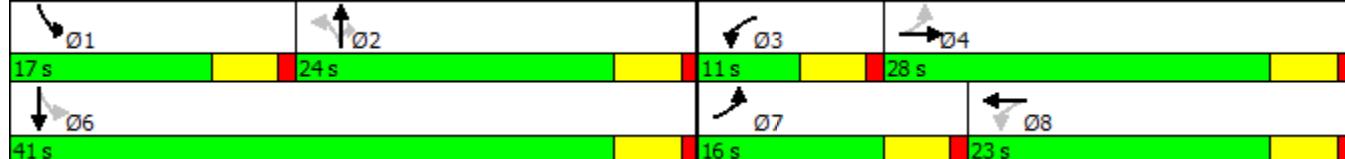
Intersection LOS: C

Intersection Capacity Utilization 81.8%

ICU Level of Service D

Analysis Period (min) 15

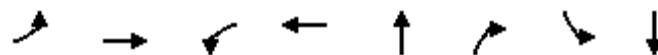
Splits and Phases: 2: Harris Road & Airport Way



2: Harris Road & Airport Way

Mitigated Conditions - Signal Option

2031 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	291	743	115	652	228	291	408	227
V/c Ratio	0.83	0.71	0.45	0.67	0.67	0.59	0.92	0.30
Control Delay	39.0	27.8	20.7	12.6	38.1	11.2	47.5	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	27.8	20.7	12.6	38.1	11.2	47.5	12.5
Queue Length 50th (m)	28.2	51.8	9.9	14.2	31.7	5.2	44.6	17.4
Queue Length 95th (m)	#73.9	77.2	21.4	32.5	54.9	26.6	#102.9	32.9
Internal Link Dist (m)		764.8		789.1	246.8			443.0
Turn Bay Length (m)	40.0		40.0			40.0	40.0	
Base Capacity (vph)	349	1102	253	1083	452	580	442	861
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	0.83	0.67	0.45	0.60	0.50	0.50	0.92	0.26

Intersection Summary

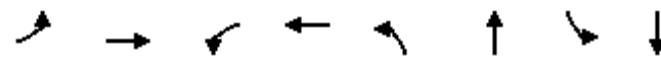
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2031 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↑	↑↓	↑	↑↓		↔	↑	↑↓
Traffic Volume (vph)	318	1243	205	543	36	81	74	81
Future Volume (vph)	318	1243	205	543	36	81	74	81
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	7	4	3	8		2		6
Permitted Phases	4			8		2		6
Detector Phase	7	4	3	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	6.0	10.0	6.0	10.0	7.0	7.0	7.0	7.0
Minimum Split (s)	11.0	23.0	11.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	20.0	41.0	15.0	36.0	24.0	24.0	24.0	24.0
Total Split (%)	25.0%	51.3%	18.8%	45.0%	30.0%	30.0%	30.0%	30.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Min	Min	Min	Min
Act Effect Green (s)	47.2	34.2	39.4	30.3		14.5	14.5	14.5
Actuated g/C Ratio	0.65	0.47	0.54	0.41		0.20	0.20	0.20
v/c Ratio	0.76	0.90	0.72	0.64		0.76	0.58	0.50
Control Delay	21.5	28.8	30.4	17.6		35.8	44.6	22.0
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	21.5	28.8	30.4	17.6		35.8	44.6	22.0
LOS	C	C	C	B		D	D	C
Approach Delay		27.3		20.2		35.8		28.7
Approach LOS		C		C		D		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 73.1

Natural Cycle: 80

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.90

Intersection Signal Delay: 25.8

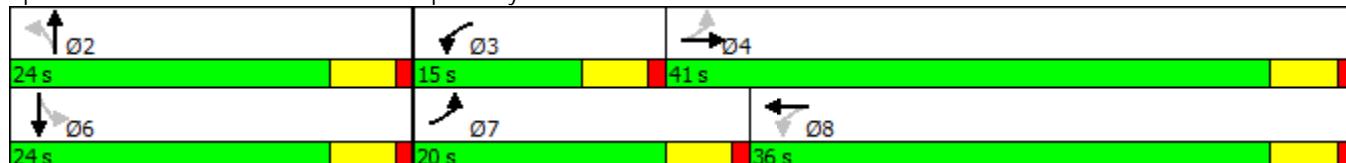
Intersection LOS: C

Intersection Capacity Utilization 88.7%

ICU Level of Service E

Analysis Period (min) 15

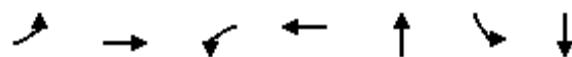
Splits and Phases: 3: Bonson Road & Airport Way



3: Bonson Road & Airport Way

Mitigated Conditions - Signal Option

2031 PM Peak Combined



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	346	1419	223	894	270	80	189
V/c Ratio	0.76	0.90	0.72	0.64	0.76	0.58	0.50
Control Delay	21.5	28.8	30.4	17.6	35.8	44.6	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.5	28.8	30.4	17.6	35.8	44.6	22.0
Queue Length 50th (m)	20.0	99.2	15.0	47.6	29.3	11.0	16.0
Queue Length 95th (m)	#61.9	#159.6	#51.3	72.7	55.5	25.6	34.8
Internal Link Dist (m)		789.1		350.3	253.5		183.5
Turn Bay Length (m)	40.0		40.0			40.0	
Base Capacity (vph)	504	1680	331	1474	449	184	481
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.84	0.67	0.61	0.60	0.43	0.39

Intersection Summary

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

Queue shown is maximum after two cycles.

MOVEMENT SUMMARY

Site: 2016 AM Existing

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	12	2.0	0.134	5.3	LOS A	0.5	3.8	0.34	0.24	46.0
8	T1	84	2.0	0.134	5.3	LOS A	0.5	3.8	0.34	0.24	45.8
18	R2	24	2.0	0.134	5.3	LOS A	0.5	3.8	0.34	0.24	44.8
Approach		120	2.0	0.134	5.3	LOS A	0.5	3.8	0.34	0.24	45.6
East: Airport Way											
1	L2	36	2.0	0.302	6.7	LOS A	1.4	10.4	0.29	0.17	45.2
6	T1	164	2.0	0.302	6.7	LOS A	1.4	10.4	0.29	0.17	45.0
16	R2	100	2.0	0.302	6.7	LOS A	1.4	10.4	0.29	0.17	44.0
Approach		300	2.0	0.302	6.7	LOS A	1.4	10.4	0.29	0.17	44.7
North: Harris Road											
7	L2	147	2.0	0.327	7.6	LOS A	1.4	11.1	0.41	0.32	43.8
4	T1	85	2.0	0.327	7.6	LOS A	1.4	11.1	0.41	0.32	43.6
14	R2	60	2.0	0.327	7.6	LOS A	1.4	11.1	0.41	0.32	42.7
Approach		292	2.0	0.327	7.6	LOS A	1.4	11.1	0.41	0.32	43.5
West: Airport Way											
5	L2	12	2.0	0.085	5.1	LOS A	0.3	2.3	0.37	0.27	46.0
2	T1	52	2.0	0.085	5.1	LOS A	0.3	2.3	0.37	0.27	45.8
12	R2	8	2.0	0.085	5.1	LOS A	0.3	2.3	0.37	0.27	44.8
Approach		72	2.0	0.085	5.1	LOS A	0.3	2.3	0.37	0.27	45.7
All Vehicles		784	2.0	0.327	6.7	LOS A	1.4	11.1	0.35	0.24	44.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

 Site: 2016 PM existing

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	8	2.0	0.231	7.2	LOS A	0.9	6.8	0.47	0.42	45.1
8	T1	119	2.0	0.231	7.2	LOS A	0.9	6.8	0.47	0.42	44.9
18	R2	52	2.0	0.231	7.2	LOS A	0.9	6.8	0.47	0.42	43.9
Approach		179	2.0	0.231	7.2	LOS A	0.9	6.8	0.47	0.42	44.6
East: Airport Way											
1	L2	20	2.0	0.354	7.8	LOS A	1.6	12.5	0.39	0.28	44.7
6	T1	72	2.0	0.354	7.8	LOS A	1.6	12.5	0.39	0.28	44.5
16	R2	235	2.0	0.354	7.8	LOS A	1.6	12.5	0.39	0.28	43.5
Approach		326	2.0	0.354	7.8	LOS A	1.6	12.5	0.39	0.28	43.8
North: Harris Road											
7	L2	140	2.0	0.272	6.3	LOS A	1.2	9.1	0.26	0.15	44.5
4	T1	116	2.0	0.272	6.3	LOS A	1.2	9.1	0.26	0.15	44.3
14	R2	16	2.0	0.272	6.3	LOS A	1.2	9.1	0.26	0.15	43.4
Approach		272	2.0	0.272	6.3	LOS A	1.2	9.1	0.26	0.15	44.3
West: Airport Way											
5	L2	52	2.0	0.279	7.4	LOS A	1.1	8.8	0.44	0.37	44.6
2	T1	161	2.0	0.279	7.4	LOS A	1.1	8.8	0.44	0.37	44.4
12	R2	20	2.0	0.279	7.4	LOS A	1.1	8.8	0.44	0.37	43.5
Approach		233	2.0	0.279	7.4	LOS A	1.1	8.8	0.44	0.37	44.4
All Vehicles		1011	2.0	0.354	7.2	LOS A	1.6	12.5	0.38	0.29	44.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 Background AM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	14	2.0	0.151	5.6	LOS A	0.6	4.3	0.36	0.27	45.8
8	T1	92	2.0	0.151	5.6	LOS A	0.6	4.3	0.36	0.27	45.7
18	R2	26	2.0	0.151	5.6	LOS A	0.6	4.3	0.36	0.27	44.7
Approach		131	2.0	0.151	5.6	LOS A	0.6	4.3	0.36	0.27	45.5
East: Airport Way											
1	L2	40	2.0	0.337	7.2	LOS A	1.6	12.1	0.32	0.20	44.9
6	T1	182	2.0	0.337	7.2	LOS A	1.6	12.1	0.32	0.20	44.7
16	R2	110	2.0	0.337	7.2	LOS A	1.6	12.1	0.32	0.20	43.8
Approach		331	2.0	0.337	7.2	LOS A	1.6	12.1	0.32	0.20	44.4
North: Harris Road											
7	L2	162	2.0	0.369	8.4	LOS A	1.7	12.9	0.45	0.36	43.4
4	T1	93	2.0	0.369	8.4	LOS A	1.7	12.9	0.45	0.36	43.3
14	R2	67	2.0	0.369	8.4	LOS A	1.7	12.9	0.45	0.36	42.4
Approach		321	2.0	0.369	8.4	LOS A	1.7	12.9	0.45	0.36	43.2
West: Airport Way											
5	L2	14	2.0	0.099	5.4	LOS A	0.3	2.7	0.39	0.30	45.8
2	T1	58	2.0	0.099	5.4	LOS A	0.3	2.7	0.39	0.30	45.6
12	R2	9	2.0	0.099	5.4	LOS A	0.3	2.7	0.39	0.30	44.6
Approach		81	2.0	0.099	5.4	LOS A	0.3	2.7	0.39	0.30	45.5
All Vehicles		865	2.0	0.369	7.2	LOS A	1.7	12.9	0.38	0.28	44.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 Background PM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	8	2.0	0.264	7.9	LOS A	1.0	7.9	0.50	0.47	44.7
8	T1	132	2.0	0.264	7.9	LOS A	1.0	7.9	0.50	0.47	44.6
18	R2	57	2.0	0.264	7.9	LOS A	1.0	7.9	0.50	0.47	43.6
Approach		196	2.0	0.264	7.9	LOS A	1.0	7.9	0.50	0.47	44.3
East: Airport Way											
1	L2	23	2.0	0.397	8.6	LOS A	1.9	14.7	0.43	0.33	44.2
6	T1	79	2.0	0.397	8.6	LOS A	1.9	14.7	0.43	0.33	44.1
16	R2	258	2.0	0.397	8.6	LOS A	1.9	14.7	0.43	0.33	43.1
Approach		360	2.0	0.397	8.6	LOS A	1.9	14.7	0.43	0.33	43.4
North: Harris Road											
7	L2	154	2.0	0.303	6.7	LOS A	1.4	10.5	0.29	0.17	44.3
4	T1	128	2.0	0.303	6.7	LOS A	1.4	10.5	0.29	0.17	44.1
14	R2	18	2.0	0.303	6.7	LOS A	1.4	10.5	0.29	0.17	43.2
Approach		300	2.0	0.303	6.7	LOS A	1.4	10.5	0.29	0.17	44.1
West: Airport Way											
5	L2	58	2.0	0.316	8.1	LOS A	1.3	10.2	0.48	0.41	44.2
2	T1	177	2.0	0.316	8.1	LOS A	1.3	10.2	0.48	0.41	44.1
12	R2	22	2.0	0.316	8.1	LOS A	1.3	10.2	0.48	0.41	43.1
Approach		257	2.0	0.316	8.1	LOS A	1.3	10.2	0.48	0.41	44.0
All Vehicles		1114	2.0	0.397	7.8	LOS A	1.9	14.7	0.42	0.33	43.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 Background AM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	16	2.0	0.185	6.2	LOS A	0.7	5.4	0.40	0.32	45.5
8	T1	108	2.0	0.185	6.2	LOS A	0.7	5.4	0.40	0.32	45.3
18	R2	31	2.0	0.185	6.2	LOS A	0.7	5.4	0.40	0.32	44.4
Approach		155	2.0	0.185	6.2	LOS A	0.7	5.4	0.40	0.32	45.1
East: Airport Way											
1	L2	47	2.0	0.407	8.3	LOS A	2.0	15.7	0.37	0.25	44.3
6	T1	214	2.0	0.407	8.3	LOS A	2.0	15.7	0.37	0.25	44.1
16	R2	130	2.0	0.407	8.3	LOS A	2.0	15.7	0.37	0.25	43.2
Approach		391	2.0	0.407	8.3	LOS A	2.0	15.7	0.37	0.25	43.8
North: Harris Road											
7	L2	192	2.0	0.456	10.1	LOS B	2.3	17.4	0.53	0.46	42.5
4	T1	110	2.0	0.456	10.1	LOS B	2.3	17.4	0.53	0.46	42.4
14	R2	79	2.0	0.456	10.1	LOS B	2.3	17.4	0.53	0.46	41.5
Approach		381	2.0	0.456	10.1	LOS B	2.3	17.4	0.53	0.46	42.3
West: Airport Way											
5	L2	16	2.0	0.121	5.9	LOS A	0.4	3.3	0.43	0.35	45.5
2	T1	67	2.0	0.121	5.9	LOS A	0.4	3.3	0.43	0.35	45.4
12	R2	11	2.0	0.121	5.9	LOS A	0.4	3.3	0.43	0.35	44.4
Approach		94	2.0	0.121	5.9	LOS A	0.4	3.3	0.43	0.35	45.3
All Vehicles		1020	2.0	0.456	8.5	LOS A	2.3	17.4	0.44	0.35	43.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 Background PM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	11	2.0	0.338	9.5	LOS A	1.4	10.5	0.56	0.56	43.8
8	T1	156	2.0	0.338	9.5	LOS A	1.4	10.5	0.56	0.56	43.7
18	R2	68	2.0	0.338	9.5	LOS A	1.4	10.5	0.56	0.56	42.8
Approach		234	2.0	0.338	9.5	LOS A	1.4	10.5	0.56	0.56	43.4
East: Airport Way											
1	L2	27	2.0	0.488	10.4	LOS B	2.5	19.7	0.52	0.43	43.3
6	T1	94	2.0	0.488	10.4	LOS B	2.5	19.7	0.52	0.43	43.1
16	R2	305	2.0	0.488	10.4	LOS B	2.5	19.7	0.52	0.43	42.2
Approach		425	2.0	0.488	10.4	LOS B	2.5	19.7	0.52	0.43	42.5
North: Harris Road											
7	L2	182	2.0	0.364	7.6	LOS A	1.7	13.4	0.34	0.22	43.8
4	T1	151	2.0	0.364	7.6	LOS A	1.7	13.4	0.34	0.22	43.6
14	R2	20	2.0	0.364	7.6	LOS A	1.7	13.4	0.34	0.22	42.7
Approach		353	2.0	0.364	7.6	LOS A	1.7	13.4	0.34	0.22	43.7
West: Airport Way											
5	L2	68	2.0	0.395	9.7	LOS A	1.7	13.5	0.55	0.52	43.4
2	T1	209	2.0	0.395	9.7	LOS A	1.7	13.5	0.55	0.52	43.2
12	R2	25	2.0	0.395	9.7	LOS A	1.7	13.5	0.55	0.52	42.3
Approach		303	2.0	0.395	9.7	LOS A	1.7	13.5	0.55	0.52	43.2
All Vehicles		1315	2.0	0.488	9.3	LOS A	2.5	19.7	0.48	0.42	43.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 Combined AM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	39	7.0	0.253	8.1	LOS A	0.9	7.4	0.50	0.47	44.1
8	T1	91	7.0	0.253	8.1	LOS A	0.9	7.4	0.50	0.47	44.0
18	R2	47	7.0	0.253	8.1	LOS A	0.9	7.4	0.50	0.47	43.0
Approach		177	7.0	0.253	8.1	LOS A	0.9	7.4	0.50	0.47	43.8
East: Airport Way											
1	L2	142	7.0	1.044	64.0	LOS F	42.5	342.2	1.00	1.65	26.6
6	T1	540	7.0	1.044	64.0	LOS F	42.5	342.2	1.00	1.65	26.5
16	R2	230	7.0	1.044	64.0	LOS F	42.5	342.2	1.00	1.65	26.2
Approach		912	7.0	1.044	64.0	LOS F	42.5	342.2	1.00	1.65	26.4
North: Harris Road											
7	L2	246	7.0	1.192	130.9	LOS F	41.0	329.9	1.00	3.34	17.9
4	T1	120	7.0	1.192	130.9	LOS F	41.0	329.9	1.00	3.34	17.9
14	R2	234	7.0	1.192	130.9	LOS F	41.0	329.9	1.00	3.34	17.7
Approach		600	7.0	1.192	130.9	LOS F	41.0	329.9	1.00	3.34	17.8
West: Airport Way											
5	L2	47	7.0	0.294	9.2	LOS A	1.1	8.7	0.54	0.54	43.5
2	T1	132	7.0	0.294	9.2	LOS A	1.1	8.7	0.54	0.54	43.4
12	R2	14	7.0	0.294	9.2	LOS A	1.1	8.7	0.54	0.54	42.5
Approach		193	7.0	0.294	9.2	LOS A	1.1	8.7	0.54	0.54	43.4
All Vehicles		1882	7.0	1.192	74.4	LOS F	42.5	342.2	0.91	1.96	24.6

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 Combined PM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	14	7.0	0.829	43.4	LOS E	5.6	45.3	0.88	1.20	31.2
8	T1	149	7.0	0.829	43.4	LOS E	5.6	45.3	0.88	1.20	31.1
18	R2	176	7.0	0.829	43.4	LOS E	5.6	45.3	0.88	1.20	30.7
Approach		339	7.0	0.829	43.4	LOS E	5.6	45.3	0.88	1.20	30.9
East: Airport Way											
1	L2	70	7.0	0.824	27.8	LOS D	8.5	68.6	0.86	1.07	35.8
6	T1	210	7.0	0.824	27.8	LOS D	8.5	68.6	0.86	1.07	35.8
16	R2	320	7.0	0.824	27.8	LOS D	8.5	68.6	0.86	1.07	35.1
Approach		600	7.0	0.824	27.8	LOS D	8.5	68.6	0.86	1.07	35.4
North: Harris Road											
7	L2	284	2.0	0.591	13.6	LOS B	3.9	30.0	0.64	0.65	40.8
4	T1	118	2.0	0.591	13.6	LOS B	3.9	30.0	0.64	0.65	40.6
14	R2	76	2.0	0.591	13.6	LOS B	3.9	30.0	0.64	0.65	39.8
Approach		478	2.0	0.591	13.6	LOS B	3.9	30.0	0.64	0.65	40.6
West: Airport Way											
5	L2	290	7.0	1.571	281.8	LOS F	130.8	1052.7	1.00	6.00	10.4
2	T1	677	7.0	1.571	281.8	LOS F	130.8	1052.7	1.00	6.00	10.4
12	R2	54	7.0	1.571	281.8	LOS F	130.8	1052.7	1.00	6.00	10.4
Approach		1021	7.0	1.571	281.8	LOS F	130.8	1052.7	1.00	6.00	10.4
All Vehicles		2438	6.0	1.571	133.6	LOS F	130.8	1052.7	0.88	3.07	17.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 Combined AM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	40	7.0	0.342	9.9	LOS A	1.3	10.4	0.56	0.56	43.3
8	T1	117	7.0	0.342	9.9	LOS A	1.3	10.4	0.56	0.56	43.2
18	R2	70	7.0	0.342	9.9	LOS A	1.3	10.4	0.56	0.56	42.3
Approach		227	7.0	0.342	9.9	LOS A	1.3	10.4	0.56	0.56	42.9
East: Airport Way											
1	L2	222	7.0	1.319	168.4	LOS F	110.0	884.9	1.00	3.85	15.2
6	T1	568	7.0	1.319	168.4	LOS F	110.0	884.9	1.00	3.85	15.2
16	R2	329	7.0	1.319	168.4	LOS F	110.0	884.9	1.00	3.85	15.1
Approach		1119	7.0	1.319	168.4	LOS F	110.0	884.9	1.00	3.85	15.2
North: Harris Road											
7	L2	356	7.0	1.441	230.1	LOS F	84.5	680.1	1.00	5.10	12.1
4	T1	168	7.0	1.441	230.1	LOS F	84.5	680.1	1.00	5.10	12.1
14	R2	244	7.0	1.441	230.1	LOS F	84.5	680.1	1.00	5.10	12.0
Approach		768	7.0	1.441	230.1	LOS F	84.5	680.1	1.00	5.10	12.1
West: Airport Way											
5	L2	48	7.0	0.340	10.8	LOS B	1.3	10.3	0.59	0.60	42.7
2	T1	140	7.0	0.340	10.8	LOS B	1.3	10.3	0.59	0.60	42.6
12	R2	16	7.0	0.340	10.8	LOS B	1.3	10.3	0.59	0.60	41.8
Approach		203	7.0	0.340	10.8	LOS B	1.3	10.3	0.59	0.60	42.6
All Vehicles		2317	7.0	1.441	159.5	LOS F	110.0	884.9	0.92	3.66	15.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 Combined PM

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	16	7.0	1.314	185.7	LOS F	48.2	388.3	1.00	3.91	14.2
8	T1	218	7.0	1.314	185.7	LOS F	48.2	388.3	1.00	3.91	14.1
18	R2	298	7.0	1.314	185.7	LOS F	48.2	388.3	1.00	3.91	14.0
Approach		531	7.0	1.314	185.7	LOS F	48.2	388.3	1.00	3.91	14.1
East: Airport Way											
1	L2	118	7.0	1.047	69.2	LOS F	32.9	264.4	1.00	2.10	25.5
6	T1	222	7.0	1.047	69.2	LOS F	32.9	264.4	1.00	2.10	25.5
16	R2	444	7.0	1.047	69.2	LOS F	32.9	264.4	1.00	2.10	25.2
Approach		784	7.0	1.047	69.2	LOS F	32.9	264.4	1.00	2.10	25.3
North: Harris Road											
7	L2	417	7.0	0.882	34.2	LOS D	11.3	91.0	0.93	1.23	33.2
4	T1	156	7.0	0.882	34.2	LOS D	11.3	91.0	0.93	1.23	33.2
14	R2	77	7.0	0.882	34.2	LOS D	11.3	91.0	0.93	1.23	32.6
Approach		649	7.0	0.882	34.2	LOS D	11.3	91.0	0.93	1.23	33.1
West: Airport Way											
5	L2	298	7.0	2.085	513.5	LOS F	185.0	1488.5	1.00	7.66	6.3
2	T1	703	7.0	2.085	513.5	LOS F	185.0	1488.5	1.00	7.66	6.3
12	R2	57	7.0	2.085	513.5	LOS F	185.0	1488.5	1.00	7.66	6.3
Approach		1058	7.0	2.085	513.5	LOS F	185.0	1488.5	1.00	7.66	6.3
All Vehicles		3022	7.0	2.085	237.7	LOS F	185.0	1488.5	0.98	4.18	11.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 Combined AM - Mitigated

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	39	7.0	0.169	6.5	LOS A	0.4	3.5	0.37	0.35	44.8
8	T1	91	7.0	0.169	6.5	LOS A	0.4	3.5	0.37	0.35	44.7
18	R2	47	7.0	0.062	5.4	LOS A	0.2	1.3	0.36	0.31	44.6
Approach		177	7.0	0.169	6.2	LOS A	0.4	3.5	0.37	0.34	44.7
East: Airport Way											
1	L2	142	7.0	0.522	11.1	LOS B	2.7	21.9	0.48	0.36	42.4
6	T1	540	7.0	0.522	11.1	LOS B	2.7	21.9	0.48	0.36	42.5
16	R2	230	7.0	0.522	11.1	LOS B	2.7	21.9	0.48	0.36	41.9
Approach		912	7.0	0.522	11.1	LOS B	2.7	21.9	0.48	0.36	42.4
North: Harris Road											
7	L2	246	7.0	0.415	12.4	LOS B	1.4	11.3	0.57	0.61	40.5
4	T1	120	7.0	0.576	16.4	LOS C	2.3	18.6	0.62	0.70	40.3
14	R2	234	7.0	0.576	16.4	LOS C	2.3	18.6	0.62	0.70	39.5
Approach		600	7.0	0.576	14.7	LOS B	2.3	18.6	0.60	0.66	40.1
West: Airport Way											
5	L2	47	7.0	0.136	6.6	LOS A	0.4	2.9	0.42	0.40	44.3
2	T1	132	7.0	0.136	6.5	LOS A	0.4	2.9	0.40	0.39	45.0
12	R2	14	7.0	0.136	6.4	LOS A	0.3	2.7	0.39	0.38	44.3
Approach		193	7.0	0.136	6.5	LOS A	0.4	2.9	0.41	0.39	44.7
All Vehicles		1882	7.0	0.576	11.3	LOS B	2.7	21.9	0.50	0.46	42.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 Combined PM - Mitigated

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	14	7.0	0.422	18.0	LOS C	1.3	10.4	0.74	0.80	39.7
8	T1	149	7.0	0.422	18.0	LOS C	1.3	10.4	0.74	0.80	39.6
18	R2	176	7.0	0.424	17.1	LOS C	1.3	10.2	0.72	0.78	39.1
Approach		339	7.0	0.424	17.5	LOS C	1.3	10.4	0.73	0.79	39.3
East: Airport Way											
1	L2	70	7.0	0.431	11.8	LOS B	1.9	15.2	0.60	0.64	42.2
6	T1	210	7.0	0.431	11.8	LOS B	1.9	15.2	0.60	0.64	42.1
16	R2	320	7.0	0.492	13.2	LOS B	2.4	19.1	0.63	0.68	40.7
Approach		600	7.0	0.492	12.6	LOS B	2.4	19.1	0.62	0.66	41.4
North: Harris Road											
7	L2	284	7.0	0.336	8.1	LOS A	1.0	8.1	0.36	0.32	42.5
4	T1	118	7.0	0.232	6.8	LOS A	0.7	5.4	0.35	0.29	45.2
14	R2	76	7.0	0.232	6.8	LOS A	0.7	5.4	0.35	0.29	44.1
Approach		478	7.0	0.336	7.5	LOS A	1.0	8.1	0.36	0.31	43.4
West: Airport Way											
5	L2	290	7.0	0.801	28.5	LOS D	6.9	55.7	0.84	1.07	35.1
2	T1	677	7.0	0.801	28.5	LOS D	6.9	55.7	0.84	1.07	35.5
12	R2	54	7.0	0.801	28.5	LOS D	6.9	55.7	0.84	1.07	35.1
Approach		1021	7.0	0.801	28.5	LOS D	6.9	55.7	0.84	1.07	35.4
All Vehicles		2438	7.0	0.801	18.9	LOS C	6.9	55.7	0.68	0.78	38.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 Combined PM - Mitigated

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	16	7.0	0.689	34.6	LOS D	2.6	21.2	0.86	1.02	33.8
8	T1	218	7.0	0.689	34.6	LOS D	2.6	21.2	0.86	1.02	33.7
18	R2	298	7.0	0.815	45.5	LOS E	3.8	30.3	0.89	1.14	30.0
Approach		531	7.0	0.815	40.7	LOS E	3.8	30.3	0.87	1.09	31.5
East: Airport Way											
1	L2	118	7.0	0.568	16.5	LOS C	3.0	24.0	0.70	0.78	39.9
6	T1	222	7.0	0.568	16.5	LOS C	3.0	24.0	0.70	0.78	39.9
16	R2	444	7.0	0.743	25.1	LOS D	5.3	42.8	0.80	0.98	36.0
Approach		784	7.0	0.743	21.4	LOS C	5.3	42.8	0.76	0.90	37.6
North: Harris Road											
7	L2	417	7.0	0.707	18.0	LOS C	4.2	33.4	0.61	0.68	38.7
4	T1	156	7.0	0.707	18.0	LOS C	4.2	33.4	0.61	0.68	38.6
14	R2	77	7.0	0.097	5.5	LOS A	0.2	2.0	0.34	0.28	44.6
Approach		649	7.0	0.707	16.5	LOS C	4.2	33.4	0.58	0.63	39.3
West: Airport Way											
5	L2	298	7.0	0.855	35.4	LOS E	6.3	51.0	0.81	1.08	33.0
2	T1	703	7.0	0.855	34.8	LOS D	6.3	51.0	0.80	1.06	33.5
12	R2	57	7.0	0.855	34.5	LOS D	6.1	49.3	0.80	1.05	33.2
Approach		1058	7.0	0.855	35.0	LOS D	6.3	51.0	0.81	1.07	33.3
All Vehicles		3022	7.0	0.855	28.5	LOS D	6.3	51.0	0.76	0.93	35.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 Combined AM - Mitigated

Airport Way-Harris Road
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Harris Road											
3	L2	40	7.0	0.223	7.7	LOS A	0.6	4.7	0.43	0.43	44.3
8	T1	117	7.0	0.223	7.7	LOS A	0.6	4.7	0.43	0.43	44.2
18	R2	70	7.0	0.103	6.4	LOS A	0.3	2.1	0.42	0.40	44.1
Approach		227	7.0	0.223	7.3	LOS A	0.6	4.7	0.43	0.42	44.2
East: Airport Way											
1	L2	222	7.0	0.659	15.3	LOS C	4.8	38.3	0.61	0.54	40.3
6	T1	568	7.0	0.659	15.3	LOS C	4.8	38.3	0.61	0.54	40.5
16	R2	329	7.0	0.659	15.3	LOS C	4.8	38.3	0.61	0.54	39.9
Approach		1119	7.0	0.659	15.3	LOS C	4.8	38.3	0.61	0.54	40.3
North: Harris Road											
7	L2	356	7.0	0.923	47.8	LOS E	8.0	64.0	0.86	1.30	29.7
4	T1	168	7.0	0.923	47.8	LOS E	8.0	64.0	0.86	1.30	29.6
14	R2	244	7.0	0.451	14.2	LOS B	1.6	12.5	0.62	0.67	40.3
Approach		768	7.0	0.923	37.1	LOS E	8.0	64.0	0.79	1.10	32.3
West: Airport Way											
5	L2	48	7.0	0.172	8.3	LOS A	0.5	3.6	0.50	0.50	43.5
2	T1	140	7.0	0.172	8.2	LOS A	0.5	3.6	0.49	0.49	44.1
12	R2	16	7.0	0.172	8.0	LOS A	0.4	3.5	0.48	0.48	43.5
Approach		203	7.0	0.172	8.2	LOS A	0.5	3.6	0.49	0.49	43.9
All Vehicles		2317	7.0	0.923	21.1	LOS C	8.0	64.0	0.64	0.71	37.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2016 AM Existing

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	28	2.0	0.526	12.2	LOS B	3.0	23.2	0.61	0.61	42.4
8	T1	213	2.0	0.526	12.2	LOS B	3.0	23.2	0.61	0.61	42.3
18	R2	172	2.0	0.526	12.2	LOS B	3.0	23.2	0.61	0.61	41.4
Approach		413	2.0	0.526	12.2	LOS B	3.0	23.2	0.61	0.61	41.9
East: Airport Way											
1	L2	105	2.0	0.605	13.4	LOS B	4.2	32.2	0.62	0.57	41.6
6	T1	228	2.0	0.605	13.4	LOS B	4.2	32.2	0.62	0.57	41.4
16	R2	185	2.0	0.605	13.4	LOS B	4.2	32.2	0.62	0.57	40.6
Approach		518	2.0	0.605	13.4	LOS B	4.2	32.2	0.62	0.57	41.2
North: Bonson Road											
7	L2	180	2.0	0.350	8.9	LOS A	1.5	11.4	0.52	0.49	42.8
4	T1	72	2.0	0.350	8.9	LOS A	1.5	11.4	0.52	0.49	42.7
14	R2	16	2.0	0.350	8.9	LOS A	1.5	11.4	0.52	0.49	41.8
Approach		268	2.0	0.350	8.9	LOS A	1.5	11.4	0.52	0.49	42.7
West: Airport Way											
5	L2	12	2.0	0.224	7.1	LOS A	0.8	6.6	0.47	0.42	45.1
2	T1	144	2.0	0.224	7.1	LOS A	0.8	6.6	0.47	0.42	44.9
12	R2	16	2.0	0.224	7.1	LOS A	0.8	6.6	0.47	0.42	43.9
Approach		172	2.0	0.224	7.1	LOS A	0.8	6.6	0.47	0.42	44.8
All Vehicles		1371	2.0	0.605	11.4	LOS B	4.2	32.2	0.58	0.55	42.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2016 PM Existing

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	20	2.0	0.225	7.0	LOS A	0.9	6.7	0.45	0.39	45.0
8	T1	56	2.0	0.225	7.0	LOS A	0.9	6.7	0.45	0.39	44.8
18	R2	103	2.0	0.225	7.0	LOS A	0.9	6.7	0.45	0.39	43.9
Approach		179	2.0	0.225	7.0	LOS A	0.9	6.7	0.45	0.39	44.3
East: Airport Way											
1	L2	171	2.0	0.737	16.7	LOS C	6.9	53.5	0.59	0.37	40.0
6	T1	292	2.0	0.737	16.7	LOS C	6.9	53.5	0.59	0.37	39.9
16	R2	272	2.0	0.737	16.7	LOS C	6.9	53.5	0.59	0.37	39.2
Approach		735	2.0	0.737	16.7	LOS C	6.9	53.5	0.59	0.37	39.7
North: Bonson Road											
7	L2	60	2.0	0.201	7.7	LOS A	0.7	5.6	0.52	0.51	43.9
4	T1	56	2.0	0.201	7.7	LOS A	0.7	5.6	0.52	0.51	43.8
14	R2	20	2.0	0.201	7.7	LOS A	0.7	5.6	0.52	0.51	42.9
Approach		136	2.0	0.201	7.7	LOS A	0.7	5.6	0.52	0.51	43.7
West: Airport Way											
5	L2	28	2.0	0.398	9.2	LOS A	1.8	14.1	0.50	0.44	43.9
2	T1	237	2.0	0.398	9.2	LOS A	1.8	14.1	0.50	0.44	43.8
12	R2	64	2.0	0.398	9.2	LOS A	1.8	14.1	0.50	0.44	42.9
Approach		329	2.0	0.398	9.2	LOS A	1.8	14.1	0.50	0.44	43.6
All Vehicles		1379	2.0	0.737	12.7	LOS B	6.9	53.5	0.54	0.40	41.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 AM Background

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	31	2.0	0.599	14.6	LOS B	3.9	30.2	0.68	0.74	41.3
8	T1	234	2.0	0.599	14.6	LOS B	3.9	30.2	0.68	0.74	41.2
18	R2	190	2.0	0.599	14.6	LOS B	3.9	30.2	0.68	0.74	40.3
Approach		455	2.0	0.599	14.6	LOS B	3.9	30.2	0.68	0.74	40.8
East: Airport Way											
1	L2	116	2.0	0.684	16.6	LOS C	5.6	43.7	0.71	0.72	40.2
6	T1	251	2.0	0.684	16.6	LOS C	5.6	43.7	0.71	0.72	40.0
16	R2	203	2.0	0.684	16.6	LOS C	5.6	43.7	0.71	0.72	39.3
Approach		570	2.0	0.684	16.6	LOS C	5.6	43.7	0.71	0.72	39.8
North: Bonson Road											
7	L2	198	2.0	0.399	10.1	LOS B	1.8	13.8	0.57	0.56	42.3
4	T1	79	2.0	0.399	10.1	LOS B	1.8	13.8	0.57	0.56	42.1
14	R2	17	2.0	0.399	10.1	LOS B	1.8	13.8	0.57	0.56	41.3
Approach		294	2.0	0.399	10.1	LOS B	1.8	13.8	0.57	0.56	42.2
West: Airport Way											
5	L2	14	2.0	0.257	7.8	LOS A	1.0	7.7	0.50	0.46	44.7
2	T1	159	2.0	0.257	7.8	LOS A	1.0	7.7	0.50	0.46	44.5
12	R2	17	2.0	0.257	7.8	LOS A	1.0	7.7	0.50	0.46	43.6
Approach		191	2.0	0.257	7.8	LOS A	1.0	7.7	0.50	0.46	44.5
All Vehicles		1510	2.0	0.684	13.6	LOS B	5.6	43.7	0.65	0.66	41.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 PM Background

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	22	2.0	0.256	7.6	LOS A	1.0	7.7	0.48	0.43	44.7
8	T1	61	2.0	0.256	7.6	LOS A	1.0	7.7	0.48	0.43	44.5
18	R2	114	2.0	0.256	7.6	LOS A	1.0	7.7	0.48	0.43	43.6
Approach		197	2.0	0.256	7.6	LOS A	1.0	7.7	0.48	0.43	44.0
East: Airport Way											
1	L2	188	2.0	0.820	21.9	LOS C	10.8	83.2	0.76	0.53	37.9
6	T1	321	2.0	0.820	21.9	LOS C	10.8	83.2	0.76	0.53	37.8
16	R2	300	2.0	0.820	21.9	LOS C	10.8	83.2	0.76	0.53	37.1
Approach		809	2.0	0.820	21.9	LOS C	10.8	83.2	0.76	0.53	37.6
North: Bonson Road											
7	L2	66	2.0	0.233	8.4	LOS A	0.8	6.6	0.55	0.55	43.5
4	T1	62	2.0	0.233	8.4	LOS A	0.8	6.6	0.55	0.55	43.4
14	R2	22	2.0	0.233	8.4	LOS A	0.8	6.6	0.55	0.55	42.5
Approach		150	2.0	0.233	8.4	LOS A	0.8	6.6	0.55	0.55	43.3
West: Airport Way											
5	L2	31	2.0	0.450	10.4	LOS B	2.2	17.1	0.55	0.51	43.3
2	T1	260	2.0	0.450	10.4	LOS B	2.2	17.1	0.55	0.51	43.2
12	R2	70	2.0	0.450	10.4	LOS B	2.2	17.1	0.55	0.51	42.3
Approach		361	2.0	0.450	10.4	LOS B	2.2	17.1	0.55	0.51	43.0
All Vehicles		1517	2.0	0.820	16.0	LOS C	10.8	83.2	0.65	0.52	40.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 AM Background

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	37	2.0	0.759	23.0	LOS C	6.7	51.6	0.84	1.00	37.7
8	T1	277	2.0	0.759	23.0	LOS C	6.7	51.6	0.84	1.00	37.6
18	R2	225	2.0	0.759	23.0	LOS C	6.7	51.6	0.84	1.00	36.9
Approach		538	2.0	0.759	23.0	LOS C	6.7	51.6	0.84	1.00	37.3
East: Airport Way											
1	L2	136	2.0	0.850	28.7	LOS D	10.9	84.3	0.95	1.16	35.5
6	T1	296	2.0	0.850	28.7	LOS D	10.9	84.3	0.95	1.16	35.4
16	R2	241	2.0	0.850	28.7	LOS D	10.9	84.3	0.95	1.16	34.8
Approach		673	2.0	0.850	28.7	LOS D	10.9	84.3	0.95	1.16	35.2
North: Bonson Road											
7	L2	233	2.0	0.508	13.1	LOS B	2.7	20.8	0.65	0.71	40.9
4	T1	95	2.0	0.508	13.1	LOS B	2.7	20.8	0.65	0.71	40.8
14	R2	21	2.0	0.508	13.1	LOS B	2.7	20.8	0.65	0.71	40.0
Approach		349	2.0	0.508	13.1	LOS B	2.7	20.8	0.65	0.71	40.8
West: Airport Way											
5	L2	17	2.0	0.326	9.4	LOS A	1.3	10.0	0.56	0.56	43.9
2	T1	188	2.0	0.326	9.4	LOS A	1.3	10.0	0.56	0.56	43.7
12	R2	21	2.0	0.326	9.4	LOS A	1.3	10.0	0.56	0.56	42.8
Approach		225	2.0	0.326	9.4	LOS A	1.3	10.0	0.56	0.56	43.7
All Vehicles		1784	2.0	0.850	21.5	LOS C	10.9	84.3	0.81	0.95	37.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 PM Background

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	27	2.0	0.324	9.0	LOS A	1.3	10.1	0.54	0.53	43.9
8	T1	73	2.0	0.324	9.0	LOS A	1.3	10.1	0.54	0.53	43.8
18	R2	134	2.0	0.324	9.0	LOS A	1.3	10.1	0.54	0.53	42.8
Approach		233	2.0	0.324	9.0	LOS A	1.3	10.1	0.54	0.53	43.2
East: Airport Way											
1	L2	222	2.0	0.992	47.8	LOS E	36.1	278.6	1.00	1.08	30.0
6	T1	380	2.0	0.992	47.8	LOS E	36.1	278.6	1.00	1.08	29.9
16	R2	354	2.0	0.992	47.8	LOS E	36.1	278.6	1.00	1.08	29.5
Approach		957	2.0	0.992	47.8	LOS E	36.1	278.6	1.00	1.08	29.8
North: Bonson Road											
7	L2	78	2.0	0.305	10.4	LOS B	1.1	8.8	0.61	0.61	42.6
4	T1	73	2.0	0.305	10.4	LOS B	1.1	8.8	0.61	0.61	42.4
14	R2	27	2.0	0.305	10.4	LOS B	1.1	8.8	0.61	0.61	41.6
Approach		178	2.0	0.305	10.4	LOS B	1.1	8.8	0.61	0.61	42.4
West: Airport Way											
5	L2	37	2.0	0.565	13.6	LOS B	3.4	26.6	0.65	0.70	41.8
2	T1	308	2.0	0.565	13.6	LOS B	3.4	26.6	0.65	0.70	41.6
12	R2	83	2.0	0.565	13.6	LOS B	3.4	26.6	0.65	0.70	40.8
Approach		428	2.0	0.565	13.6	LOS B	3.4	26.6	0.65	0.70	41.5
All Vehicles		1796	2.0	0.992	30.9	LOS D	36.1	278.6	0.82	0.87	34.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

 Site: 2021 AM Combined

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	60	7.0	0.617	18.6	LOS C	3.5	27.8	0.73	0.84	39.3
8	T1	130	7.0	0.617	18.6	LOS C	3.5	27.8	0.73	0.84	39.2
18	R2	171	7.0	0.617	18.6	LOS C	3.5	27.8	0.73	0.84	38.4
Approach		361	7.0	0.617	18.6	LOS C	3.5	27.8	0.73	0.84	38.8
East: Airport Way											
1	L2	93	7.0	1.268	148.2	LOS F	90.3	726.8	1.00	3.70	16.6
6	T1	806	7.0	1.268	148.2	LOS F	90.3	726.8	1.00	3.70	16.6
16	R2	133	7.0	1.268	148.2	LOS F	90.3	726.8	1.00	3.70	16.5
Approach		1032	7.0	1.268	148.2	LOS F	90.3	726.8	1.00	3.70	16.6
North: Bonson Road											
7	L2	184	7.0	0.922	54.2	LOS F	9.3	74.8	0.90	1.44	28.3
4	T1	54	7.0	0.922	54.2	LOS F	9.3	74.8	0.90	1.44	28.3
14	R2	189	7.0	0.922	54.2	LOS F	9.3	74.8	0.90	1.44	27.9
Approach		428	7.0	0.922	54.2	LOS F	9.3	74.8	0.90	1.44	28.1
West: Airport Way											
5	L2	53	7.0	0.506	12.1	LOS B	2.6	20.8	0.58	0.57	42.3
2	T1	313	7.0	0.506	12.1	LOS B	2.6	20.8	0.58	0.57	42.2
12	R2	16	7.0	0.506	12.1	LOS B	2.6	20.8	0.58	0.57	41.4
Approach		382	7.0	0.506	12.1	LOS B	2.6	20.8	0.58	0.57	42.2
All Vehicles		2203	7.0	1.268	85.1	LOS F	90.3	726.8	0.86	2.25	23.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 PM Combined

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	31	7.0	0.481	17.5	LOS C	2.0	16.2	0.71	0.79	39.8
8	T1	63	7.0	0.481	17.5	LOS C	2.0	16.2	0.71	0.79	39.7
18	R2	123	7.0	0.481	17.5	LOS C	2.0	16.2	0.71	0.79	38.9
Approach		218	7.0	0.481	17.5	LOS C	2.0	16.2	0.71	0.79	39.3
East: Airport Way											
1	L2	198	7.0	1.137	96.7	LOS F	57.9	465.9	1.00	2.64	21.5
6	T1	469	7.0	1.137	96.7	LOS F	57.9	465.9	1.00	2.64	21.5
16	R2	263	7.0	1.137	96.7	LOS F	57.9	465.9	1.00	2.64	21.3
Approach		930	7.0	1.137	96.7	LOS F	57.9	465.9	1.00	2.64	21.4
North: Bonson Road											
7	L2	70	7.0	0.395	12.8	LOS B	1.6	12.7	0.64	0.68	41.6
4	T1	71	7.0	0.395	12.8	LOS B	1.6	12.7	0.64	0.68	41.5
14	R2	74	7.0	0.395	12.8	LOS B	1.6	12.7	0.64	0.68	40.6
Approach		216	7.0	0.395	12.8	LOS B	1.6	12.7	0.64	0.68	41.2
West: Airport Way											
5	L2	253	7.0	1.760	362.5	LOS F	200.3	1611.7	1.00	6.72	8.5
2	T1	1016	7.0	1.760	362.5	LOS F	200.3	1611.7	1.00	6.72	8.5
12	R2	58	7.0	1.760	362.5	LOS F	200.3	1611.7	1.00	6.72	8.5
Approach		1327	7.0	1.760	362.5	LOS F	200.3	1611.7	1.00	6.72	8.5
All Vehicles		2690	7.0	1.760	214.6	LOS F	200.3	1611.7	0.95	4.35	12.8

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

 Site: 2031 AM Combined

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	72	7.0	0.823	35.0	LOS D	6.6	53.1	0.86	1.15	33.5
8	T1	167	5.0	0.823	35.0	LOS D	6.6	53.1	0.86	1.15	33.4
18	R2	201	7.0	0.823	35.0	LOS D	6.6	53.1	0.86	1.15	32.9
Approach		440	6.2	0.823	35.0	LOS D	6.6	53.1	0.86	1.15	33.2
East: Airport Way											
1	L2	112	7.0	1.738	352.7	LOS F	197.8	1591.8	1.00	6.60	8.7
6	T1	1057	7.0	1.738	352.7	LOS F	197.8	1591.8	1.00	6.60	8.7
16	R2	158	7.0	1.738	352.7	LOS F	197.8	1591.8	1.00	6.60	8.6
Approach		1327	7.0	1.738	352.7	LOS F	197.8	1591.8	1.00	6.60	8.7
North: Bonson Road											
7	L2	218	7.0	1.167	123.5	LOS F	35.3	284.0	1.00	3.11	18.5
4	T1	83	7.0	1.167	123.5	LOS F	35.3	284.0	1.00	3.11	18.5
14	R2	254	7.0	1.167	123.5	LOS F	35.3	284.0	1.00	3.11	18.3
Approach		556	7.0	1.167	123.5	LOS F	35.3	284.0	1.00	3.11	18.4
West: Airport Way											
5	L2	68	7.0	0.648	16.5	LOS C	4.4	35.2	0.68	0.73	40.3
2	T1	389	7.0	0.648	16.5	LOS C	4.4	35.2	0.68	0.73	40.2
12	R2	28	7.0	0.648	16.5	LOS C	4.4	35.2	0.68	0.73	39.4
Approach		484	7.0	0.648	16.5	LOS C	4.4	35.2	0.68	0.73	40.2
All Vehicles		2807	6.9	1.738	199.5	LOS F	197.8	1591.8	0.92	4.04	13.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 PM Combined

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	40	7.0	0.614	22.9	LOS C	3.0	24.2	0.76	0.89	37.6
8	T1	90	7.0	0.614	22.9	LOS C	3.0	24.2	0.76	0.89	37.5
18	R2	147	7.0	0.614	22.9	LOS C	3.0	24.2	0.76	0.89	36.8
Approach		277	7.0	0.614	22.9	LOS C	3.0	24.2	0.76	0.89	37.1
East: Airport Way											
1	L2	228	7.0	1.452	226.8	LOS F	132.2	1064.1	1.00	5.07	12.3
6	T1	603	7.0	1.452	226.8	LOS F	132.2	1064.1	1.00	5.07	12.3
16	R2	311	7.0	1.452	226.8	LOS F	132.2	1064.1	1.00	5.07	12.2
Approach		1142	7.0	1.452	226.8	LOS F	132.2	1064.1	1.00	5.07	12.2
North: Bonson Road											
7	L2	82	7.0	0.502	15.5	LOS C	2.3	18.6	0.68	0.76	40.4
4	T1	90	7.0	0.502	15.5	LOS C	2.3	18.6	0.68	0.76	40.3
14	R2	103	7.0	0.502	15.5	LOS C	2.3	18.6	0.68	0.76	39.5
Approach		276	7.0	0.502	15.5	LOS C	2.3	18.6	0.68	0.76	40.0
West: Airport Way											
5	L2	353	7.0	2.430	661.4	LOS F	358.0	2881.3	1.00	8.80	5.1
2	T1	1381	7.0	2.430	661.4	LOS F	358.0	2881.3	1.00	8.80	5.1
12	R2	70	7.0	2.430	661.4	LOS F	358.0	2881.3	1.00	8.80	5.0
Approach		1804	7.0	2.430	661.4	LOS F	358.0	2881.3	1.00	8.80	5.1
All Vehicles		3499	7.0	2.430	418.2	LOS F	358.0	2881.3	0.96	6.32	7.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 AM Combined - Mitigated

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	60	7.0	0.517	13.1	LOS B	2.0	16.0	0.55	0.60	41.7
8	T1	130	7.0	0.517	13.1	LOS B	2.0	16.0	0.55	0.60	41.6
18	R2	171	7.0	0.517	13.1	LOS B	2.0	16.0	0.55	0.60	40.8
Approach		361	7.0	0.517	13.1	LOS B	2.0	16.0	0.55	0.60	41.2
East: Airport Way											
1	L2	93	7.0	0.634	14.9	LOS B	4.3	34.5	0.62	0.59	40.9
6	T1	806	7.0	0.634	14.9	LOS B	4.3	34.5	0.62	0.59	41.0
16	R2	133	7.0	0.634	14.9	LOS B	4.3	34.5	0.62	0.59	40.2
Approach		1032	7.0	0.634	14.9	LOS B	4.3	34.5	0.62	0.59	40.9
North: Bonson Road											
7	L2	184	7.0	0.831	36.8	LOS E	4.8	38.6	0.82	1.07	32.6
4	T1	54	7.0	0.831	36.8	LOS E	4.8	38.6	0.82	1.07	32.6
14	R2	189	7.0	0.831	36.8	LOS E	4.8	38.6	0.82	1.07	32.1
Approach		428	7.0	0.831	36.8	LOS E	4.8	38.6	0.82	1.07	32.4
West: Airport Way											
5	L2	53	7.0	0.258	7.8	LOS A	1.0	7.7	0.47	0.42	44.2
2	T1	313	7.0	0.258	7.8	LOS A	1.0	7.7	0.47	0.42	44.4
12	R2	16	7.0	0.258	7.8	LOS A	1.0	7.7	0.47	0.42	43.6
Approach		382	7.0	0.258	7.8	LOS A	1.0	7.7	0.47	0.42	44.3
All Vehicles		2203	7.0	0.831	17.6	LOS C	4.8	38.6	0.62	0.66	39.4

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2021 PM Combined - Mitigated

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	31	7.0	0.562	23.4	LOS C	1.9	15.1	0.78	0.88	37.4
8	T1	63	7.0	0.562	23.4	LOS C	1.9	15.1	0.78	0.88	37.3
18	R2	123	7.0	0.562	23.4	LOS C	1.9	15.1	0.78	0.88	36.6
Approach		218	7.0	0.562	23.4	LOS C	1.9	15.1	0.78	0.88	36.9
East: Airport Way											
1	L2	198	7.0	0.639	16.5	LOS C	4.2	33.6	0.68	0.76	39.8
6	T1	469	7.0	0.639	16.5	LOS C	4.2	33.6	0.68	0.76	40.0
16	R2	263	7.0	0.639	16.5	LOS C	4.2	33.6	0.68	0.76	39.5
Approach		930	7.0	0.639	16.5	LOS C	4.2	33.6	0.68	0.76	39.8
North: Bonson Road											
7	L2	70	7.0	0.344	10.5	LOS B	1.0	8.2	0.52	0.54	42.7
4	T1	71	7.0	0.344	10.5	LOS B	1.0	8.2	0.52	0.54	42.6
14	R2	74	7.0	0.344	10.5	LOS B	1.0	8.2	0.52	0.54	41.7
Approach		216	7.0	0.344	10.5	LOS B	1.0	8.2	0.52	0.54	42.3
West: Airport Way											
5	L2	253	7.0	0.903	37.2	LOS E	12.6	101.6	0.96	1.31	32.7
2	T1	1016	7.0	0.903	37.2	LOS E	12.6	101.6	0.96	1.31	32.8
12	R2	58	7.0	0.903	37.2	LOS E	12.6	101.6	0.96	1.31	32.4
Approach		1327	7.0	0.903	37.2	LOS E	12.6	101.6	0.96	1.31	32.8
All Vehicles		2690	7.0	0.903	26.8	LOS D	12.6	101.6	0.81	1.02	35.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 AM Combined - Mitigated

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	72	7.0	0.375	10.9	LOS B	1.2	9.3	0.52	0.55	42.6
8	T1	167	7.0	0.375	10.9	LOS B	1.2	9.3	0.52	0.55	42.5
18	R2	201	7.0	0.327	10.3	LOS B	1.0	8.0	0.53	0.54	42.1
Approach		440	7.0	0.375	10.6	LOS B	1.2	9.3	0.53	0.55	42.3
East: Airport Way											
1	L2	112	7.0	0.797	23.1	LOS C	6.4	51.7	0.71	0.80	37.6
6	T1	1057	7.0	0.797	22.9	LOS C	6.4	51.7	0.69	0.78	37.7
16	R2	158	7.0	0.797	22.8	LOS C	6.1	49.2	0.68	0.76	37.0
Approach		1327	7.0	0.797	22.9	LOS C	6.4	51.7	0.69	0.78	37.6
North: Bonson Road											
7	L2	218	7.0	0.558	23.1	LOS C	1.9	15.7	0.78	0.88	36.4
4	T1	83	7.0	0.810	40.5	LOS E	3.9	31.8	0.86	1.11	31.9
14	R2	254	7.0	0.810	40.5	LOS E	3.9	31.8	0.86	1.11	31.3
Approach		556	7.0	0.810	33.7	LOS D	3.9	31.8	0.83	1.02	33.2
West: Airport Way											
5	L2	68	7.0	0.316	8.5	LOS A	1.0	7.8	0.44	0.43	43.8
2	T1	389	7.0	0.316	8.4	LOS A	1.0	7.8	0.42	0.42	44.1
12	R2	28	7.0	0.316	8.4	LOS A	0.9	7.4	0.41	0.41	43.3
Approach		484	7.0	0.316	8.4	LOS A	1.0	7.8	0.43	0.42	44.0
All Vehicles		2807	7.0	0.810	20.6	LOS C	6.4	51.7	0.65	0.73	38.2

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

MOVEMENT SUMMARY

Site: 2031 PM Combined - Mitigated

Airport Way-Bonson Rd
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Bonson Road											
3	L2	40	7.0	0.434	23.1	LOS C	1.3	10.2	0.81	0.88	37.4
8	T1	90	7.0	0.434	23.1	LOS C	1.3	10.2	0.81	0.88	37.3
18	R2	147	7.0	0.450	22.1	LOS C	1.3	10.5	0.79	0.87	37.1
Approach		277	7.0	0.450	22.6	LOS C	1.3	10.5	0.80	0.87	37.2
East: Airport Way											
1	L2	228	7.0	0.757	22.0	LOS C	5.0	40.5	0.70	0.83	37.6
6	T1	603	7.0	0.757	21.8	LOS C	5.0	40.5	0.69	0.81	37.8
16	R2	311	7.0	0.757	21.6	LOS C	4.8	38.7	0.68	0.79	37.4
Approach		1142	7.0	0.757	21.8	LOS C	5.0	40.5	0.69	0.81	37.7
North: Bonson Road											
7	L2	82	7.0	0.157	8.9	LOS A	0.4	3.3	0.54	0.54	42.1
4	T1	90	7.0	0.352	11.8	LOS B	1.0	8.3	0.58	0.61	42.5
14	R2	103	7.0	0.352	11.8	LOS B	1.0	8.3	0.58	0.61	41.5
Approach		276	7.0	0.352	10.9	LOS B	1.0	8.3	0.57	0.59	42.0
West: Airport Way											
5	L2	353	7.0	1.165	108.8	LOS F	54.0	434.9	1.00	3.33	20.1
2	T1	1381	7.0	1.165	108.5	LOS F	54.6	439.3	1.00	3.34	20.2
12	R2	70	7.0	1.165	108.3	LOS F	54.6	439.3	1.00	3.36	20.0
Approach		1804	7.0	1.165	108.6	LOS F	54.6	439.3	1.00	3.34	20.2
All Vehicles		3499	7.0	1.165	65.8	LOS F	54.6	439.3	0.85	2.10	26.1

Level of Service (LOS) Method: Delay & v/c (HCM 2010).

Roundabout LOS Method: Same as Sign Control.

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

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

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: US HCM 2010.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

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

Appendix D

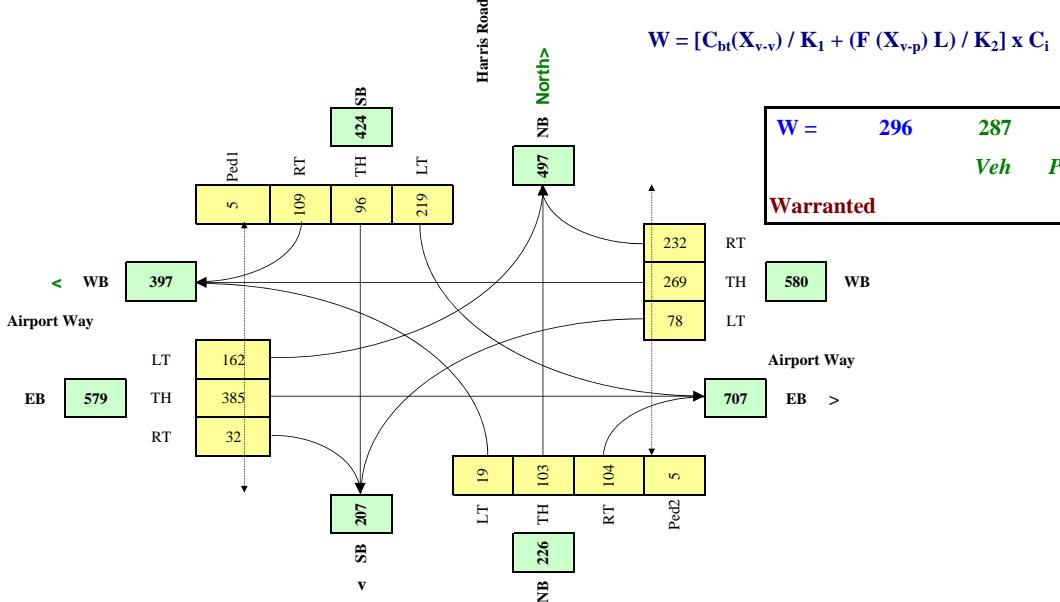
Signal Warrants



Canadian Traffic Signal Warrant Matrix Analysis

Main Street (name)	Airport Way	Direction (EW or NS)	EW	Date:	Mar 05, 2016											
Side Street (name)	Harris Road	Direction (EW or NS)	NS	City:	Pitt Meadows											
Quadrant (if appl)		Comments	2021 Combined													
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT												
Airport Way	WB			Th & RT												
Airport Way	EB			Excl RT												
Harris Road	NB			Upstream Signal (m)												
Harris Road	SB			# of Thru Lanes												
Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)											
Airport Way	EW	50	2.0%	y	n											
Harris Road	NS	50	2.0%	y												
Traffic Input		NB	SB	WB	EB											
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	Ped1	Ped2	Ped3	Ped4
													NS	NS	EW	EW
7:00 - 8:00	35	82	42	221	108	211	128	486	207	42	119	13	6	1	1	7
8:00 - 9:00	35	82	42	221	108	211	128	486	207	42	119	13	6	1	1	7
12:00 - 13:00	9	94	111	179	74	48	44	132	202	183	426	34	4	7	4	5
13:00 - 14:00	9	94	111	179	74	48	44	132	202	183	426	34	4	7	4	5
16:00 - 17:00	13	134	158	256	106	68	63	189	288	261	609	49	4	7	4	5
17:00 - 18:00	13	134	158	256	106	68	63	189	288	261	609	49	4	7	4	5
Total (6-hour peak)	114	620	621	1,312	576	653	470	1,615	1,393	971	2,309	193	28	30	18	34
Average (6-hour peak)	19	103	104	219	96	109	78	269	232	162	385	32	5	5	3	6

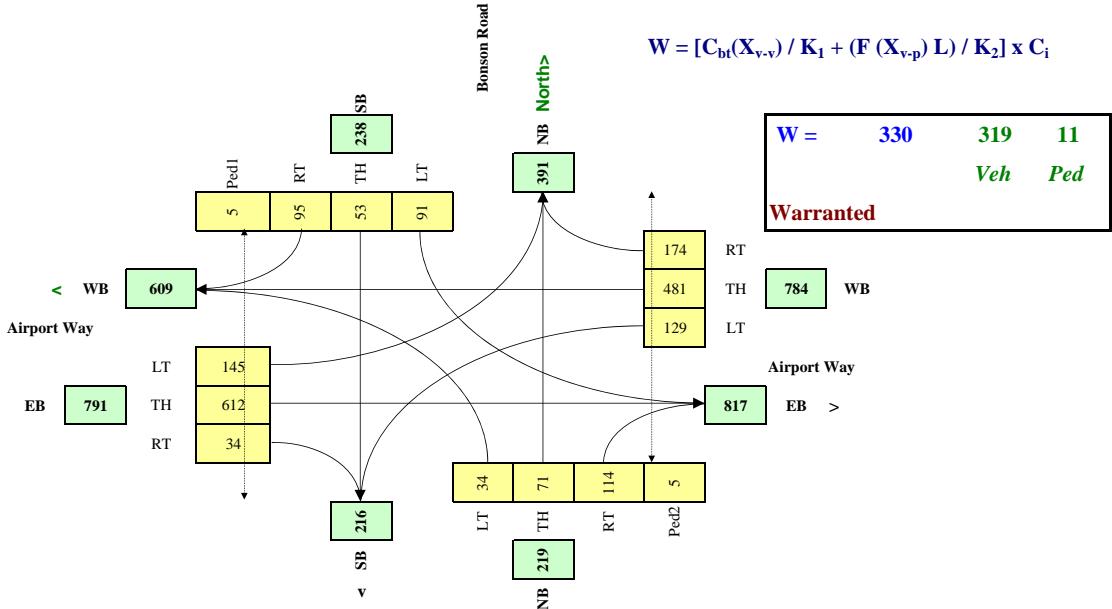
Average 6-hour
Peak Turning
Movements



Canadian Traffic Signal Warrant Matrix Analysis

Main Street (name)	Airport Way	Direction (EW or NS)	EW	Date:	Mar 05, 2016
Side Street (name)	Bonson Road	Direction (EW or NS)	NS	City:	Pitt Meadows
Quadrant (if appl)		Comments	2021 Combined		
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	# of Thru Lanes
Airport Way	WB			1	1
Airport Way	EB			1	1
Bonson Road	NB			1	1
Bonson Road	SB			1	1
Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Airport Way	EW	50	2.0%	y	n
Bonson Road	NS	50	2.0%	y	
Traffic Input	NB	SB	WB	EB	Ped1 Ped2 Ped3 Ped4
	LT Th RT	LT Th RT	LT Th RT	LT Th RT	NS NS EW EW
7:00 - 8:00	54 117 154	166 49 170	84 725 120	48 282 14	6 1 1 7
8:00 - 9:00	54 117 154	166 49 170	84 725 120	48 282 14	6 1 1 7
12:00 - 13:00	20 40 78	44 45 47	125 295 166	160 640 36	4 7 4 5
13:00 - 14:00	20 40 78	44 45 47	125 295 166	160 640 36	4 7 4 5
16:00 - 17:00	28 57 111	63 64 67	178 422 237	228 914 52	4 7 4 5
17:00 - 18:00	28 57 111	63 64 67	178 422 237	228 914 52	4 7 4 5
Total (6-hour peak)	203 428 685	546 316 568	773 2,885 1,046	871 3,672 205	28 30 18 34
Average (6-hour peak)	34 71 114	91 53 95	129 481 174	145 612 34	5 5 3 6

Average 6-hour
Peak Turning
Movements



Appendix E

Wolski Cost Estimate Summary

South Bonson Traffic Study, Pitt Meadows

Planning Design Construction Cost Estimate EST.DATE April, 2016

Description	Opt. 1 - Roundabout Two lane approaches & single exit lane on Harris Road Four lanes on Airport Way	Opt. 1 - Roundabout Two lane approaches & single exit lane on Bonson Road Four lanes on Airport Way	Future Sidewalk Sidewalk from Airport Way to Fieldstone Walk on Harris Rd. on E & W Side	Future Sidewalk Sidewalk from Airport Way to Fraser Way on Harris Rd. on E Side	Future Sidewalk Sidewalk from Lasser Rd. to Bonson Rd. on Sutton Ave. on N Side	Future Bicycle Lane from Sutton Ave. to Hammond Rd. On Bonson Rd. on both sides	Future Bicycle Lane from Airport Way to Fraser Way On Harris Rd. on both sides	4 laning Airport Way from Baynes Rd. to West of Golden Ear Way SB Ramps	OPTION 1 Total
Engineering & Project Management	\$134,175	\$119,793	\$18,896	\$11,014	\$11,014	\$1,467	\$843	\$443,274	\$740,476
Grade Construction	\$384,284	\$281,284	\$126,067	\$70,447	\$70,447	\$2,060	\$2,060	\$1,474,129	\$2,410,779
Other Construction (Environmental Mitigation & Archaeological)	\$46,350	\$46,350	\$1,854	\$1,854	\$1,854	\$1,854	\$1,854	\$46,350	\$148,320
Drainage	\$51,393	\$51,393	\$0	\$0	\$0	\$0	\$0	\$60,487	\$163,273
Structural Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Paving Construction	\$68,958	\$68,958	\$0	\$0	\$0	\$0	\$0	\$751,795	\$889,710
Signing & Pavement Markings / Operational Construction (Signing, Pavement Marking and Guard Rail ie. Barriers)	\$36,054	\$36,054	\$4,120	\$3,296	\$3,296	\$6,548	\$2,104	\$32,433	\$123,904
Electrical (Lighting and Signal)	\$58,500	\$58,500	\$0	\$0	\$0	\$0	\$0	\$42,500	\$159,500
Landscaping	\$11,664	\$11,664	\$3,264	\$3,264	\$3,264	\$0	\$0	\$37,312	\$70,432
Utility Construction (hydro, telephone, pipelines etc.)	\$162,000	\$162,000	\$0	\$0	\$0	\$0	\$0	\$176,000	\$500,000
Resident Engineering/Construction Supervision	\$61,189	\$51,816	\$12,390	\$7,243	\$7,243	\$1,061	\$599	\$219,186	\$360,728
Total Eng. & PM & Construction	\$1,014,567	\$887,812	\$166,591	\$97,119	\$97,119	\$12,989	\$7,460	\$3,283,465	\$5,567,122
Land acquisition									\$0
Contingency 30%	\$304,370	\$266,344	\$49,977	\$29,136	\$29,136	\$3,897	\$2,238	\$985,040	\$1,670,137
TOTAL	\$1,318,937	\$1,154,156	\$216,568	\$126,254	\$126,254	\$16,886	\$9,698	\$4,268,505	\$7,237,259

Description	Opt. 2 - Signal at intersection of Harris Road / Airport Way With Four lanes on With Four lanes on	Opt. 2 - Signal at intersection of Bonson Road / Airport Way With Four lanes on With Four lanes on	Future Sidewalk Sidewalk from Airport Way to Fieldstone Walk on Harris Rd. on Harris Rd.	Future Sidewalk Sidewalk from Airport Way to Fraser Way on Harris Rd. on Harris Rd.	Future Sidewalk Sidewalk from Lasser Rd. to Bonson Rd. on Sutton Ave. on Sutton Ave.	Future Bicycle Lane from Sutton Ave. to Hammond Rd. On Bonson Rd. on Harris Rd.	Future Bicycle Lane from Airport Way to Fraser Way On Harris Rd. on Harris Rd.	4 laning Airport Way from Baynes Rd. to West of Golden Ear Way SB Ramps	OPTION 2 Total
Engineering & Project Management	\$159,780	\$145,399	\$18,896	\$11,014	\$11,014	\$1,467	\$843	\$443,274	\$791,687
Grade Construction	\$323,308	\$220,308	\$126,067	\$70,447	\$70,447	\$2,060	\$2,060	\$1,474,129	\$2,288,827
Other Construction (Environmental Mitigation & Archaeological)	\$46,350	\$46,350	\$1,854	\$1,854	\$1,854	\$1,854	\$1,854	\$46,350	\$148,320
Drainage	\$51,393	\$51,393	\$0	\$0	\$0	\$0	\$0	\$60,487	\$163,273
Structural Construction	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Paving Construction	\$68,958	\$68,958	\$0	\$0	\$0	\$0	\$0	\$751,795	\$889,710
Signing & Pavement Markings / Operational Construction (Signing, Pavement Marking and Guard Rail ie. Barriers)	\$29,211	\$29,211	\$4,120	\$3,296	\$3,296	\$6,548	\$2,104	\$32,433	\$110,219
Electrical (Lighting and Signal)	\$308,500	\$308,500	\$0	\$0	\$0	\$0	\$0	\$42,500	\$659,500
Landscaping	\$11,664	\$11,664	\$3,264	\$3,264	\$3,264	\$0	\$0	\$37,312	\$70,432
Utility Construction (hydro, telephone, pipelines etc.)	\$162,000	\$162,000	\$0	\$0	\$0	\$0	\$0	\$176,000	\$500,000
Resident Engineering/Construction Supervision	\$80,929	\$71,556	\$12,390	\$7,243	\$7,243	\$1,061	\$599	\$219,186	\$400,207
Total Eng. & PM & Construction	\$1,242,093	\$1,115,338	\$166,591	\$97,119	\$97,119	\$12,989	\$7,460	\$3,283,465	\$6,022,174
Land acquisition									\$0
Contingency 30%	\$372,628	\$334,602	\$49,977	\$29,136	\$29,136	\$3,897	\$2,238	\$985,040	\$1,806,652
TOTAL	\$1,614,720	\$1,449,940	\$216,568	\$126,254	\$126,254	\$16,886	\$9,698	\$4,268,505	\$7,828,827

Estimated by: P. Nahal

Printing Date: 4/14/2016 Time: 9:19 AM

File: O:\Proj\2121-00209-00 City of Pitt Meadows-South
 Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3
Company MCSL
 (2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est. Blk Est. # 6.14A Version Sept.1, 2001	Division\site Road Type	Opt. 1 - Roundabout Two lane approaches & single exit lane on Harris Road Four lanes on	Opt. 1 - Roundabout Two lane approaches & single exit lane on Bonson Road Four lanes on	Future Sidewalk	Future Sidewalk	Future Sidewalk	Future Sidewalk	Bicycle Lan	4 laning	Opt 1 - South Bonson Traffic Study Road improvements Construction Cost Estimates	Total	Road Type		
				Airport Way	Airport Way	Airport Way to Fieldstone Walk	Airport Way to Fraser Way	Sidewalk from Lasser Rd. to Bonson Rd.	Sidewalk from Sutton Ave. to Hammond Rd.	Sidewalk from Airport Way to Fraser Way	Sidewalk from Airport Way to Golden Ear Way	Line	1. 2ln Fron	
Length	MR	2	2	500	2	2	400	2	1250	MR	6750	Cost	C/LM	2. 2ln Acc
Engineering Land	174,427	155,731	24,565	14,319	14,319	1,906	1,096	576,256			962,619		143	0
Construction	0	0	0	0	0	0	0	0	0	0	0		0	0
Management Reserve	1,144,510	998,425	192,004	111,935	111,935	14,980	8,602	3,692,249			6,274,640		930	0
Escalation	0	0	0	0	0	0	0	0	0	0	0		0	0
Total	1,318,937	1,154,156	216,568	126,254	126,254	16,886	9,698	4,268,505			7,237,259		1072	
BASIC QUANTITY SUMMARY														
Construct.Cost ONLY Per L.M.	1,431	1,248	384	280	280	12	22	1,678	\$/LM		930			
Land Area	0.9	0.9	0.4	0.4	0.4	0.0	0.0	4.4	ha		7.3			
Mobilization	19,142	16,142	3,941	2,297	2,297	305	175	71,214			115,512			
Land Cont.	0	0	0	0	0	0	0	0			0		0	
Construction Cont.	245,761	214,861	40,591	23,658	23,658	3,139	1,805	786,302			1,339,776		1,447,994	
Engineering Cont.	40,252	35,938	5,669	3,304	3,304	440	253	132,982			222,143			
Supervision Cont.	18,357	15,545	3,717	2,173	2,173	318	180	65,756			108,218			
Total Cont.	304,370	266,344	49,977	29,136	29,136	3,897	2,238	985,040			1,670,137			
S.G.S.B.	765	765	195	195	195	0	0	8,052	m3		10,167			
C.B.C.	585	585	177	177	177	0	0	6,732	m3		8,433			
Asphalt	431	431	0	0	0	0	0	5,211	t		6,073			
Concrete Barrier	0	0	0	0	0	0	0	0	lm		0		0	
Noise Attenuation Wall	0	0	0	0	0	0	0	0	m2		0		0	
No. of Light Poles	0	0	0	0	0	0	0	0	ea		0		0	
Sidewalk	0	0	1,000	400	400	0	0	0	lm		1,800			
Curb and Gutter	320	320	0	0	0	0	0	0	lm		640			
Signals	0	0	0	0	0	0	0	0	ea		0		0	
Bridge total area	0	0	0	0	0	0	0	0	m2		0			
Total Rock	0	0	0	0	0	0	0	0	m3		0		0	
Total OM	3,915	3,915	668	668	668	0	0	33,000	m3		42,833			
Total Stripping	1,350	1,350	0	0	0	0	0	6,600	m3		9,300			
Total Borrow	0	0	0	0	0	0	0	0	m3		0		0	
Total Cut/Excavation	5,265	5,265	668	668	668	0	0	39,600	m3		52,133		0	
Total Fill	0	0	0	0	0	0	0	0	m3		0		0	
Surplus or Deficit	5,265	5,265	668	668	668	0	0	39,600	m3		52,133			
ENG & PM	0.174	0.156	0.025	0.014	0.014	0.002	0.001	0.576			0.963		0.962	
LAND	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000		0.000	
CONST.	1.145	0.998	0.192	0.112	0.112	0.015	0.009	3.692			6.275		6.275	
BRIDGES-R/W	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000		0.000	
MANAGEMENT RESERVE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000		0.000	
ESCALATION	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			0.000		0.000	
TOTAL (Millions) (2016 Dollars)	1.319	1.154	0.217	0.126	0.126	0.017	0.010	4.268			7.238		7.237	
TOTAL Cost per meter \$	1,649 \$	1,443 \$	433 \$	316 \$	316 \$	14 \$	24 \$	1,940			\$ 1,072			
Construction cost per meter \$	1,431 \$	1,248 \$	384 \$	280 \$	280 \$	12 \$	23 \$	1,678			\$ 930			
									Land		0.00			
									Construction		7.24			
									Total		7.24			

Estimated by: P. Nahal

Printing Date: 4/14/2016 Time: 9:19 AM

File: O:\Proj\2121-00209-00 City of Pitt Meadows-South
 Bonson Traffic Study\4.0 ENGINEERING DESIGN\4.3
Company MCSL
 (2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est.
 Blk Est. # 6.14A
 Version Sept.1, 2000

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South

File: Bonson Traffic Study4.0 ENGINEERING DESIGN4.3

Company **MCSL**(2016 Dollars) **South Bonson Traffic Study**ACTIVITY **Concept Design Cost Estimate**CODE **EST.DATE** March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 2001

DESCRIPTION \Length

Divison\site

Road Type

MR

800

MR

2

2

MR

500

MR

400

MR

1250

MR

2

400

MR

2200

MR

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File: O:\Proj\2121-00209-00 City of Pitt Meadows-South
 Bonson Traffic Study4.0 ENGINEERING DESIGN4.3
Company MCSL
 (2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est. Blk Est. # 6.14A Version Sept.1, 2001	Division\site Road Type	Divison\site Road Type	Opt. 1 - Roundabout Two lane approaches & single exit lane on Harris Road Four lanes on Airport Way	Opt. 1 - Roundabout Two lane approaches & single exit lane on Bonson Road Four lanes on Airport Way	Future Sidewalk Sidewalk from Airport Way to Fieldstone Walk on Harris Rd.	Future Sidewalk Sidewalk from Airport Way to Fraser Way on Harris Rd.	Future Sidewalk Sidewalk from Lasser Rd. to Bonson Rd. on Sutton Ave.	Future Sidewalk Sidewalk from Sutton Ave. to Hammond Rd. On Bonson Rd.	Bicycle Lane from Hammond Rd. to Fraser Way On Harris Rd.	Larue Way from Fraser Way to Golden Ear Way to West of	4 laning Airport Way	Opt 1 - South Bonson			Total Line Cost C/LM	Road Type 1. 2ln Fron 2. 2ln Acc 3. 4ln Acc 4.R4L-4L E 5.R2/3L-4L 6.Retr.4L-4 7.R4L-4LE 8. New 4L		
												MR	OR	TR				
6700	UTILITIES																	
6710	Util. Prov. - Hydro		114,000		114,000	0	0	0	0	0	0	0	0	110,000				
6711	Util. Prov. - Telephone		48,000		48,000	0	0	0	0	0	0	0	0	66,000				
	Util. Prov. sub-total		162,000		162,000	0	0	0	0	0	0	0	0	176,000				
6712	Util.Others - pipelines		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6713	Util.Others - telecommunication		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6714	Util.Others - storm & sewer inspect.		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6715	Util.Others - waterworks inspect.		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6716	Util.Others - engineering services		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6717	Util.Others - parks/recreation-prel.		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6718	Util.Others - transit		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6719	Util.Others - tr-ops/signs & detours		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6701	Util.Others - general		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Util.Others sub-total		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
6799	Util.Others Contingency		48,600		48,600	0	0	0	0	0	0	0	0	52,800				
	TOTAL UTILITIES		210,600		210,600	0	0	0	0	0	0	0	0	228,800			650,000	96
5000	GRADE CONSTRUCTION																	
5032	Grade Cons - water		22,500		22,500	0	0	0	0	0	0	0	0	22,500			67,500	10
5033	Grade Cons - sanitary		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
5034	Grade Cons - storm		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
5031	Grade Cons - mobilization		675		675	0	0	0	0	0	0	0	0	675			2,025	0
5039	Grade Cons - utility contingency		6,953		6,953	0	0	0	0	0	0	0	0	6,953			20,858	3
	Grade Const. Utilities Sub-total		30,128		30,128	0	0	0	0	0	0	0	0	30,128			90,383	13
5010	Grade Cons - site prep./clear, grubbing		7,650		7,650	3,188	3,188	3,188	3,188	0	0	0	0	37,400			62,263	9
5020	Grade Cons - road grade/exc,placing,fill		188,155		88,155	11,347	11,347	11,347	11,347	0	0	0	0	666,600			976,953	145
5030	Grade Cons - drainage/pipe,cul.		28,218		28,218	0	0	0	0	0	0	0	0	37,312			93,748	14
5040	Grade Cons - multiplate		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
5050	Grade Cons - SGSB/produce,place,comp		30,600		30,600	7,800	7,800	7,800	7,800	0	0	0	0	322,080			406,680	60
5051	Grade Cons - CBC/produce,place,comp		26,325		26,325	7,965	7,965	7,965	7,965	0	0	0	0	302,940			379,485	56
5060	Grade Cons - grade finishing landscaping		7,290		7,290	2,040	2,040	2,040	2,040	0	0	0	0	23,320			44,020	7
5061	Grade Cons - grade finishing hydro seed.		4,374		4,374	1,224	1,224	1,224	1,224	0	0	0	0	13,992			26,412	4
5062	Grade Cons - grade finishing fencing		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
5063	Grade Cons - noise barriers		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
5064	Grade Cons - passing lanes		0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
5090	Grade Cons - sidewalks, curb & gutter		19,200		19,200	90,000	36,000	36,000	36,000	0	0	0	0	0	0	0	200,400	30
5005	Grade Cons - detours c/w ex,bf,paving		100,000		100,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	100,000			310,000	46
5001	Grade Cons - mobilization		12,354		9,354	3,767	2,147	2,147	60	60	60	60	60	45,109			74,999	11
5099	Grade Cons - Contingency		127,250		96,350	38,799	22,113	22,113	618	618	618	618	618	464,626			772,488	114
	Grade Construction Sub-total		551,416		417,516	168,130	95,824	95,824	2,678	2,678	2,678	2,678	2,678	2,013,379			3,347,446	496
	GRADE CONSTRUCTION COSTS		581,544		447,644	168,130	95,824	95,824	2,678	2,678	2,678	2,678	2,678	2,043,507			3,437,829	509
3510	Grade Eng. - detailed design		31,985		24,620	9,247	5,270	5,270	147	147	147	147	147	112,393			189,081	28
3519	Grade Eng. - detailed design/Contingency		9,595		7,386	2,774	1,581	1,581	44	44	44	44	44	33,718			56,724	8
6810	Grade Eng. - general const. supervision		17,446		13,429	5,044	2,875	2,875	80	80	80	80	80	61,305			103,135	15
6811	Grade Eng. - quality assurance		11,631		8,953	3,363	1,916	1,916	54	54	54	54	54	40,870			68,757	10
6812	Grade Eng. - surveying		11,631		8,953	3,363	1,916	1,916	54	54	54	54	54	40,870			68,757	10
6819	Grade Eng. - Residency Contingency		12,212		9,401	3,531	2,012	2,012	56	56	56	56	56	42,914			72,194	11
	Grade Engineering Sub-total		94,501		72,742	27,321	15,571	15,571	435	435	435	435	435	332,070			558,647	83
	Total Grade Const. & Eng. Costs		676,045		520,386	195,451	111,396	111,396	3,113	3,113	3,113	3,113	3,113	2,375,577			3,996,476	592

Estimated by: P. Nahal

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File: Bonson Traffic Study4.0 ENGINEERING DESIGN4.3

Company **MCSL**

(2016 Dollars) **South Bonson Traffic Study**

ACTIVITY **Concept Design Cost Estimate**

CODE **EST.DATE** March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 200

Estimated by: P. Nahal

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Company MCSL
(2016 Dollars) South Bonson Traffic Study
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est.
 Blk Est. # 6.14A
 Version Sept.1, 2001

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South

File: Bonson Traffic Study4.0 ENGINEERING DESIGN4.3

Company **MCSL**(2016 Dollars) **South Bonson Traffic Study**ACTIVITY **Concept Design Cost Estimate**CODE **EST.DATE** March, 2016**Conceptual Est.****Blk Est. # 6.14A****Version Sept.1, 200****DESCRIPTION****Divison\site****Road Type****\Length****MR**

Estimated by: P. Nahal

Printing Date: 4/14/2016 Time: 9:19 AM

File: O:\Proj\2121-00209-00 City of Pitt Meadows-South
 Bonson Traffic Study4.0 ENGINEERING DESIGN4.3
Company MCSL
 (2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est. Blk Est. # 6.14A Version Sept.1, 2001	Divison\site Road Type	DESCRIPTION \Length	Opt. 1 - Roundabout	Opt. 1 - Roundabout	Future Sidewalk	Future Sidewalk	Future Sidewalk	utre	Bicycle Lan	4 laning	MR OR TR	Opt 1 - South Bonson Traffic Study Road improvements Construction Cost Estimates	Total	Road Type
			Two lane approaches & single exit lane on Harris Road	Two lane approaches & single exit lane on Bonson Road	Sidewalk from Airport Way to Fieldstone Walk	Sidewalk from Airport Way to Fraser Way	Sidewalk from Lasser Rd. to Bonson Rd.	from Sutton Ave. to Hammond Rd.	from Airport Way to Fraser Way	from Baynes Rd. to Golden Ear Way			Line	1. 2ln Fron
3500 DETAILED DESIGN from 3510,3520,3540,3550,3570			61,087	51,513	12,577	7,330	7,330	972	559	227,263			6750	1
3530 Geotech. Er - detailed design			3,845	3,242	792	461	461	61	35	14,303			0	2ln Acc
3539 Geotech. Er - Contingency			1,153	973	237	138	138	18	11	4,291			6,960	3ln Acc
TOTAL DETAILED DESIGN COSTS			66,085	55,728	13,606	7,930	7,930	1,052	605	245,858			6750	4.R4L-4L E
6800 RESIDENT ENGINEERING from 6810,6820,6840,6850,6860,6870			0	0	0	0	0	0	0	0			368,632	55
			79,546	67,361	16,108	9,416	9,416	1,380	779	284,941			23,201	3
TOTAL RESIDENT ENG. COSTS			79,546	67,361	16,108	9,416	9,416	1,380	779	284,941			6,960	1
			0	0	0	0	0	0	0	0			468,946	
			0	0	0	0	0	0	0	0			468,946	69
			0	0	0	0	0	0	0	0			0	
			0	0	0	0	0	0	0	0			0	0
PART 1 SUMMARY														
CONSTRUCTION			819,203	716,203	135,305	78,861	78,861	10,462	6,018	2,621,006			4,465,918	662
ENGINEERING & SUPERVISION			144,024	126,684	22,856	13,343	13,343	1,870	1,065	496,307			819,492	121
CONTRACTUAL CONTINGENCY			288,968	252,866	47,448	27,661	27,661	3,700	2,125	935,194			1,585,623	235
			0	0	0	0	0	0	0	0			0	0
CONSTRUCTION COST TOTAL			1,252,195	1,095,753	205,610	119,865	119,865	16,032	9,207	4,052,507			6,871,033	1018
2000 PROJECT MANAGEMENT														
2060 Project Man - office costs wages			25,044	21,915	4,112	2,397	2,397	321	184	81,050			137,421	20
2062 Project Man - office costs - expenses			6,261	5,479	1,028	599	599	80	46	20,263			34,355	5
2063 Project Man - printing costs			0	0	0	0	0	0	0	0			0	0
2061 Project Man - general			0	0	0	0	0	0	0	0			0	0
Project Manager Sub-total			31,305	27,394	5,140	2,997	2,997	401	230	101,313			171,776	25
2010 Client - office costs wages			12,522	10,958	2,056	1,199	1,199	160	92	40,525			68,710	10
2012 Client - office costs - expenses			6,261	5,479	1,028	599	599	80	46	20,263			34,355	5
2030 Client - printing costs			0	0	0	0	0	0	0	0			0	0
2011 Client - general			0	0	0	0	0	0	0	0			0	0
Client Sub-total			18,783	16,436	3,084	1,798	1,798	240	138	60,788			103,065	15
2070 Public Rel. - wages & expenses			0	0	0	0	0	0	0	0			0	0
2072 Public Rel. - adv., media, displays			0	0	0	0	0	0	0	0			0	0
2073 Public Rel. - opening ceremonies			0	0	0	0	0	0	0	0			0	0
2071 Public Rel. - general			0	0	0	0	0	0	0	0			0	0
Public Relations Sub-total			0	0	0	0	0	0	0	0			0	0
2040 Legal Costs - lawyers fees			1,252	1,096	206	120	120	16	9	4,053			6,871	1
2041 Legal Costs - general			0	0	0	0	0	0	0	0			0	0
Legal Costs Sub-total			1,252	1,096	206	120	120	16	9	4,053			6,871	1
2080 Insurance - const./ liability, E&O			0	0	0	0	0	0	0	0			0	0
2081 Insurance - general			0	0	0	0	0	0	0	0			0	0
Legal Costs Sub-total			0	0	0	0	0	0	0	0			0	0
2099 Project Management Contingency			15,402	13,478	2,529	1,474	1,474	197	113	49,846			84,514	13
TOTAL PROJECT MANAGEMENT COSTS			66,742	58,404	10,959	6,389	6,389	854	491	215,999			366,226	54

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
Bonson Traffic Study\4.0 ENGINEERING DESIGN\4.3

File: Company **MCSL**
 ACTIVITY **(2016 Dollars) South Bonson Traffic Study**
 CODE **Concept Design Cost Estimate**
 EST. DATE **March, 2016**

Conceptual Est.

Blk Est. # **6.14A**
 Version Sept.1, 2001

DESCRIPTION \Length

Division\site

Road Type

MR

800

MR

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MR

500

MR

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MR

1250

MR

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MR

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2200

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File: Bonson Traffic Study4.0 ENGINEERING DESIGN4.3

Company **MCSL**

(2016 Dollars) **South Bonson Traffic Study**

ACTIVITY **Concept Design Cost Estimate**

CODE **EST.DATE** March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 200

Divison\site

Road Type

Length

PART 2 SUMMARY NON-CONSTRUCTION CC

Non-Construction

Non-Const. Contingency

TOTAL NON-CONSTRUCTION CO:

DIVISION TOTAL FOR ROAD TYPE

Opt. 1 - Roundabout	Opt. 1 - Roundabout	Future Sidewalk	Future Sidewalk	Future Sidewalk	utre	Bicycle Lan	4 laning
Two lane approaches & single exit lane on Harris Road	Two lane approaches & single exit lane on Bonson Road	Sidewalk from Airport Way to Fieldstone Walk	Sidewalk from Airport Way to Fraser Way	Sidewalk from Lasser Rd. to Bonson Rd.	from Sutton Ave. to Hammond Rd.	Airport Way to Fraser Way	Airport Way to Golden Ear Way
Four lanes on	Four lanes on	on E & W Side	on E Side	on N Side	on both sides	SB Ramps	
-----	-----	2	2	2	2	2	2
-----	-----	MR	MR	MR	MR	MR	MR
-----	-----	800	800	500	400	1250	2200
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	0	0	0	0	0	0
-----	-----	51,340	44,926	8,430	4,914	4,914	166,153
-----	-----	15,402	13,478	2,529	1,474	1,474	49,846
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	66,742	58,404	10,959	6,389	6,389	215,999
-----	-----	-----	-----	-----	-----	-----	-----
-----	-----	1,318,937	1,154,156	216,568	126,254	126,254	4,268,505
-----	-----	-----	-----	-----	-----	-----	-----

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Opt 1 - South Bonson		Total	Road Type
Traffic Study		Line	1. 2In Fron
Road improvements		Cost	2. 2In Acc
Construction Cost			3. 4In Acc
Estimates		C/LM	4.R4L-4L E
	6750		5.R2/3L-4L
	0		6.Retr.4L-4
	6750		7.R4L-4LE
			8. New 4L
			281,712
			84,514
			366,226
			54
			7,237,259
			1072

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
File: Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**
(2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est.
Blk Est. # 6.14A
Version Sept.1, 2001

Divison\site
Road Type

With Four lanes on

Airport Way

With Four lanes on

Airport Way

on E & W Side

on Harris Rd.

on Harris Rd.

on Sutton Ave.

On Bonson Rd.

On N Side

on both sides

on both sides

on both sides

SB Ramps

4 laning

Airport Way

from Baynes Rd.

Airport Way

to West of

Golden Ear Way

MR

OR

TR

SUMMARY BY ACTIVITY LEVEL

2000 PROJECT MANAGEMENT 62,853 56,439 8,430 4,914 4,914 657 378 166,153

2500 PLANNING 0 0 0 0 0 0 0 0

3000 PRELIMINARY DESIGN 32,000 32,000 0 0 0 0 0 88,000

3500 DETAILED DESIGN 64,926 56,959 10,466 6,100 6,100 809 465 189,121

Total Engineering 96,926 88,959 10,466 6,100 6,100 809 465 277,121

4000 LAND ACQUISITION 0 0 0 0 0 0 0 0

5000 GRADE CONSTRUCTION 386,365 283,365 129,331 73,711 73,711 2,060 2,060 1,571,928

5200 ROAD SIDE CONSTRUCTION 0 0 0 0 0 0 0 0

5300 OTHER CONSTRUCTION 46,350 46,350 1,854 1,854 1,854 1,854 1,854 46,350

5500 STRUCTURAL CONSTRUCTION 0 0 0 0 0 0 0 0

6000 PAVING CONSTRUCTION 68,958 68,958 0 0 0 0 0 751,795

6500 OPERATIONAL CONSTRUCTION 337,711 337,711 4,120 3,296 3,296 6,548 2,104 74,933

6700 UTILITY CONSTRUCTION 162,000 162,000 0 0 0 0 0 176,000

6800 RESIDENT ENGINEERING 80,929 71,556 12,390 7,243 7,243 1,061 599 219,186

0 0 0 0 0 0 0 0

Total Construction 1,082,313 969,940 147,695 86,104 86,104 11,523 6,617 2,840,192

9700 CONTINGENCY 372,628 334,602 49,977 29,136 29,136 3,897 2,238 985,040

9800 SUB-TOTAL 1,614,720 1,449,940 216,568 126,254 126,254 16,886 9,698 4,268,505

0 0 0 0 0 0 0 0

TOTAL 1,614,720 1,449,940 216,568 126,254 126,254 16,886 9,698 4,268,505

9900 ESCALATION 0 0 0 0 0 0 0 0

TOTAL COST 1,614,720 1,449,940 216,568 126,254 126,254 16,886 9,698 4,268,505

Const. Less Resident Eng. 1,001,384 898,384 135,305 78,861 78,861 10,462 6,018 2,621,006

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Opt 2 - South Bonson		Total	Road Type
Traffic Study		Line	1. 2In Fron
Road improvements		Cost	2. 2In Acc
Construction Cost			3. 4In Acc
Estimates		C/LM	4.R4L-4L E
		6750	5.R2/3L-4L
		0	6.Retr.4L-4
		6750	7.R4L-4LE
			8. New 4L
			Cost/LM % of T

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
File: Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**
(2016 Dollars) **South Bonson Traffic Study**
ACTIVITY **Concept Design Cost Estimate**
CODE **EST.DATE** March, 2016

Conceptual Est.
Blk Est. # 6.14A
Version Sept.1, 2001

Divison\site
Road Type

DESCRIPTION \Length

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
File: Bonson Traffic Study4.0 ENGINEERING DESIGN4.3

Company **MCSL**
(2016 Dollars) **South Bonson Traffic Study**
ACTIVITY **Concept Design Cost Estimate**
CODE **EST.DATE** March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 200

DESCRIPTION \Length

Road Type

Divison\site

Airport Way

With Four lanes on

Opt. 2 - Signal

at intersection

of Harris Road /

Airport Way

Opt. 2 - Signal

at intersection

of Bonson Road /

Airport Way

Future Sidewalk

Sidewalk from

Airport Way to

Fieldstone Walk

Future Sidewalk

Sidewalk from

Airport Way to

Lasser Rd. to

Sutton Ave. to

Future Sidewalk

from

Airport Way to

Bonson Rd.

Future Sidewalk

from

Airport Way to

Hammond Rd.

Future Sidewalk

from

Airport Way to

On Harris Rd.

Future Sidewalk

from

Airport Way to

On Sutton Ave.

Future Sidewalk

from

Airport Way to

On Bonson Rd.

Future Sidewalk

from

Airport Way to

On N Side

Future Sidewalk

from

Airport Way to

On both sides

Future Sidewalk

from

Airport Way to

On both sides

Future Sidewalk

from

Airport Way to

Golden Ear Way

Future Sidewalk

from

Airport Way

4 laning

MR

OR

TR

Printing Date: 4/14/2016 Time: 9:19 AM

Opt 2 - South Bonson		Total	Road Type
Traffic Study		Line	1. 2ln Fron
Road improvements		Cost	2. 2ln Acc
Construction Cost			3. 4ln Acc
Estimates		C/LM	4.R4L-4L E
			5.R2/3L-4L
			6.Retr.4L-4
			7.R4L-4LE
			8. New 4L

Blk Est. #	DESCRIPTION	Length	MR	2	800	MR	2	800	MR	2	500	MR	2	400	MR	2	400	MR	2	1250	MR	2	400	MR	2	2200	MR	MR	OR	TR	
6700	UTILITIES																														
6710	Util. Prov. - Hydro		114,000		114,000		0		0		0		0		0		0		0		110,000									338,000	50
6711	Util. Prov. - Telephone		48,000		48,000		0		0		0		0		0		0		0		66,000									162,000	24
	Util. Prov. sub-total		162,000		162,000		0		0		0		0		0		0		0		176,000									500,000	74
6712	Util.Others - pipelines		0		0		0		0		0		0		0		0		0		0									0	0
6713	Util.Others - telecommunication		0		0		0		0		0		0		0		0		0		0								0	0	
6714	Util.Others - storm & sewer inspect.		0		0		0		0		0		0		0		0		0		0							0	0		
6715	Util.Others - waterworks inspect.		0		0		0		0		0		0		0		0		0		0							0	0		
6716	Util.Others - engineering services		0		0		0		0		0		0		0		0		0		0							0	0		
6717	Util.Others - parks/recreation-prel.		0		0		0		0		0		0		0		0		0		0							0	0		
6718	Util.Others - transit		0		0		0		0		0		0		0		0		0		0							0	0		
6719	Util.Others - tr-ops/signs & detours		0		0		0		0		0		0		0		0		0		0							0	0		
6701	Util.Others - general		0		0		0		0		0		0		0		0		0		0							0	0		
	Util.Others sub-total		0		0		0		0		0		0		0		0		0		0							0	0		
6799	Util.Others Contingency		48,600		48,600		0		0		0		0		0		0		0		52,800								150,000	22	
	TOTAL UTILITIES		210,600		210,600		0		0		0		0		0		0		0		228,800								650,000	96	
5000	GRADE CONSTRUCTION																														
5032	Grade Cons - water		22,500		22,500		0		0		0		0		0		0		0		22,500								67,500	10	
5033	Grade Cons - sanitary		0		0		0		0		0		0		0		0		0		0							0	0		
5034	Grade Cons - storm		0		0		0		0		0		0		0		0		0		0							0	0		
5031	Grade Cons - mobilization		675		675		0		0		0		0		0		0		0		675							2,025	0		
5039	Grade Cons - utility contingency		6,953		6,953		0		0		0		0		0		0		0		6,953							20,858	3		
	Grade Const. Utilities Sub-total		30,128		30,128		0		0		0		0		0		0		0		30,128								90,383	13	
5010	Grade Cons - site prep./clear,grubbing		7,650		7,650		3,188		3,188		3,188		0		0		0		0		37,400								62,263	9	
5020	Grade Cons - road grade/exc,placing,fill		188,155		88,155		11,347		11,347		11,347		0		0		0		0		666,600								976,953	145	
5030	Grade Cons - drainage/pipe,cul.		28,218		28,218		0		0		0		0		0		0		0		37,312								93,748	14	
5040	Grade Cons - multipitate		0		0		0		0		0		0		0		0		0		0							0	0		
5050	Grade Cons - SGSB/produce,place,comp		30,600		30,600		7,800		7,800		7,800		0		0		0		0		322,080								406,680	60	
5051	Grade Cons - CBC/produce,place,comp		26,325		26,325		7,965		7,965		7,965		0		0		0		0		302,940								379,485	56	
5060	Grade Cons - grade finishing landscaping		7,290		7,290		2,040		2,040		2,040		0		0		0		0		23,320								44,020	7	
5061	Grade Cons - grade finishing hydro seed.		4,374		4,374		1,224		1,224		1,224		0		0		0		0		13,992								26,412	4	
5062	Grade Cons - grade finishing fencing		0		0		0		0		0		0		0		0		0		0							0	0		
5063	Grade Cons - noise barriers		0		0		0		0		0		0		0		0		0		0							0	0		
5064	Grade Cons - passing lanes		0		0		0		0		0		0		0		0		0		0							0	0		
5090	Grade Cons - sidewalks,curb & gutter		0		0		90,000		36,000		36,000		0		0		0		0		0							162,000	24		
5005	Grade Cons - detours c/w ex,bf,paving		60,000		60,000		2,000		2,000		2,000		2,000		2,000		2,000		2,000		100,000								230,000	34	
5001	Grade Cons - mobilization		10,578		7,578		3,767		2,147		2,147		60		60		60		60		45,109								71,447	11	
5099	Grade Cons - Contingency		108,957		78,057		38,799		22,113		22,113		618		618		618		618		464,626								735,902	109	
	Grade Construction Sub-total		472,147		338,247		168,130		95,824		95,824		2,678		2,678		2,678		2,678		2,043,507								3,188,909	472	
	GRADE CONSTRUCTION COSTS		502,275		368,375		168,130		95,824		95,824		2,678		2,678		2,678		2,678		2,043,507								3,279,291	486	
3510	Grade Eng. - detailed design		27,625		20,261		9,247		5,270		5,270		147		147		147		147		112,393								180,361		

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South

File: Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**

(2016 Dollars) **South Bonson Traffic Study**

ACTIVITY **Concept Design Cost Estimate**

CODE **EST.DATE** March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 200

DESCRIPTION \Length

Road Type

Divison\site

Airport Way

2

800

MR

Opt. 2 - Signal

at intersection

of Harris Road /

Airport Way

2

800

MR

Opt. 2 - Signal

at intersection

of Bonson Road /

Airport Way

2

500

MR

Future Sidewalk

Sidewalk from

Airport Way to

Fieldstone Walk

2

400

MR

Future Sidewalk

Sidewalk from

Lasser Rd. to

Fraser Way

2

400

MR

Future Sidewalk

Sidewalk from

Bonson Rd.

On Sutton Ave.

2

400

MR

Future Sidewalk

Sidewalk from

On Bonson Rd.

2

1250

MR

Future Sidewalk

Sidewalk from

On Harris Rd.

2

400

MR

Future Sidewalk

Sidewalk from

Golden Ear Way

2

2200

MR

4 laning

Printing Date: 4/14/2016 Time: 9:19 AM

Opt 2 - South Bonson

Traffic Study
Road improvements
Construction Cost
Estimates

Total	Road Type
Line	1. 2In Fron
Cost	2. 2In Acc
	3. 4In Acc
C/LM	4.R4L-4L E
	5.R2/3L-4L
	6.Retr.4L-4
6750	7.R4L-4LE
6750	8. New 4L

5500 STRUCTURAL CONSTRUCTION

5522 Struct.Const - water

0 0 0 0 0 0 0 0 0

0 0

5523 Struct.Const - sanitary

0 0 0 0 0 0 0 0 0

0 0

5524 Struct.Const - storm

0 0 0 0 0 0 0 0 0

0 0

5521 Struct.Const - mobilization

0 0 0 0 0 0 0 0 0

0 0

5599 Struct.Const - utility contingency

0 0 0 0 0 0 0 0 0

0 0

Structural Const. Utilities Sub-total

0 0 0 0 0 0 0 0 0

0 0

5510 Struct.Const - tunnel site preparation

0 0 0 0 0 0 0 0 0

0 0

5511 Struct.Const - tunnel construction

0 0 0 0 0 0 0 0 0

0 0

5512 Struct.Const - snow shed site prep.

0 0 0 0 0 0 0 0 0

0 0

5513 Struct.Const - snow shed site const.

0 0 0 0 0 0 0 0 0

0 0

5514 Struct.Const - bridge site preparation

0 0 0 0 0 0 0 0 0

0 0

5515 Struct.Const - bridge piers

0 0 0 0 0 0 0 0 0

0 0

5516 Struct.Const - bridge abutments

0 0 0 0 0 0 0 0 0

0 0

5517 Struct.Const - bridge superstructure

0 0 0 0 0 0 0 0 0

0 0

5518 Struct.Const - retain. wall site prep.

0 0 0 0 0 0 0 0 0

0 0

5519 Struct.Const - retaining wall const.

0 0 0 0 0 0 0 0 0

0 0

5501 Struct.Const - mobilization

0 0 0 0 0 0 0 0 0

0 0

5529 Struct.Const - Contingency

0 0 0 0 0 0 0 0 0

0 0

Structural Construction Sub-total

0 0 0 0 0 0 0 0 0

0 0

STRUCTURAL CONSTRUCTION COSTS

0 0 0 0 0 0 0 0 0

0 0

3520 Struct. Eng. - detailed design

0 0 0 0 0 0 0 0 0

0 0

3529 Struct. Eng. - detailed design/Contingency

0 0 0 0 0 0 0 0 0

0 0

6820 Struct. Eng. - general const. supervision

0 0 0 0 0 0 0 0 0

0 0

6821 Struct. Eng. - quality assurance

0 0 0 0 0 0 0 0 0

0 0

6822 Struct. Eng. - surveying

0 0 0 0 0 0 0 0 0

0 0

6829 Struct. Eng. - Residency Contingency

0 0 0 0 0 0 0 0 0

0 0

Structural Engineering Sub-total

0 0 0 0 0 0 0 0 0

0 0

Total Structural & Eng. Costs

0 0 0 0 0 0 0 0 0

0 0

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South

Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**

(2016 Dollars) **South Bonson Traffic Study**

ACTIVITY Concept Design Cost Estimate

CODE EST.DATE March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 200

DESCRIPTION \Length

Road Type

Divison\site

Airport Way

2

800

MR

Opt. 2 - Signal

at intersection

of Harris Road /

Airport Way

2

800

MR

Opt. 2 - Signal

at intersection

of Bonson Road /

Airport Way

2

500

MR

Future Sidewalk

Sidewalk from

Airport Way to

Fieldstone Walk

2

400

MR

Future Sidewalk

Sidewalk from

Airport Way to

Lasser Rd. to

Bonson Rd.

2

400

MR

Future Sidewalk

Sidewalk from

Airport Way to

Hammond Rd.

2

400

MR

Future Sidewalk

Sidewalk from

Airport Way to

On Sutton Ave.

2

400

MR

Future Sidewalk

Sidewalk from

Airport Way to

On Bonson Rd.

2

400

MR

Future Sidewalk

Sidewalk from

Airport Way to

On Harris Rd.

2

400

MR

Future Sidewalk

Sidewalk from

Airport Way to

Golden Ear Way

2

2200

MR

4 laning

MR

OR

TR

Printing Date: 4/14/2016 Time: 9:19 AM

Opt 2 - South Bonson		Total	Road Type
Traffic Study		Line	1. 2ln Fron
Road improvements		Cost	2. 2ln Acc
Construction Cost			3. 4ln Acc
Estimates		C/LM	4.R4L-4L E
			5.R2/3L-4L
			6.Retr.4L-4
			7.R4L-4LE
			8. New 4L

6000 PAVING CONSTRUCTION

6020 Paving Cont- machine paving asphalt	66,949	66,949	0	0	0	0	0	729,898	863,797	128
6030 Paving Cont- machine paving concrete	0	0	0	0	0	0	0	0	0	0
6040 Paving Cont- hot reprofiling	0	0	0	0	0	0	0	0	0	0
6050 Paving Cont- shoulder paving	0	0	0	0	0	0	0	0	0	0
6060 Paving Cont- pavement finishing	0	0	0	0	0	0	0	0	0	0
6070 Paving Cont- seal coating	0	0	0	0	0	0	0	0	0	0
6001 Paving Cont- mobilization	2,008	2,008	0	0	0	0	0	0	21,897	25,914
6010 Paving Cont- pavement design	0	0	0	0	0	0	0	0	0	0
6099 Paving Cont- Contingency	20,687	20,687	0	0	0	0	0	225,539	266,913	40

PAVING CONSTRUCTION COSTS

89,645	89,645	0	0	0	0	0	0	977,334	1,156,624	171
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3560 Paving Eng. - detailed design	4,930	4,930	0	0	0	0	0	53,753	63,614	9
3569 Paving Eng. - detailed design/Contingency	1,479	1,479	0	0	0	0	0	16,126	19,084	3
6860 Paving Eng. - general const. supervision	1,793	1,793	0	0	0	0	0	19,547	23,132	3
6861 Paving Eng. - quality assurance	3,586	3,586	0	0	0	0	0	39,093	46,265	7
6862 Paving Eng. - surveying	448	448	0	0	0	0	0	4,887	5,783	1
6869 Paving Eng. - Residency Contingency	1,748	1,748	0	0	0	0	0	19,058	22,554	3
Paving Engineering Sub-total	13,985	13,985	0	0	0	0	0	152,464	180,433	27

Total Paving Const. & Eng. Costs

103,630	103,630	0	0	0	0	0	0	1,129,798	1,337,057	198
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6500 OPERATIONAL CONSTRUCTION

6510 Operat.Cont- lighting	58,500	58,500	0	0	0	0	0	42,500	159,500	24
6520 Operat.Cont- signals	250,000	250,000	0	0	0	0	0	0	500,000	74
6530 Operat.Cont- signing	16,000	16,000	4,000	3,200	3,200	3,750	1,200	11,000	58,350	9
6540 Operat.Cont- guard rail	0	0	0	0	0	0	0	0	0	0
6550 Operat.Cont- pavement markings	3,375	3,375	0	0	0	0	2,607	843	19,250	29,450
6501 Operat.Cont- mobilization	9,836	9,836	120	96	96	191	61	2,183	22,419	3
6599 Operat.Cont- contingency	101,313	101,313	1,236	989	989	1,964	631	22,480	230,916	34

OPERATIONAL CONSTRUCTION COSTS

439,025	439,025	5,356	4,285	4,285	8,512	2,735	97,412	1,000,634	148
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3540 Operat. Eng - detailed design	24,146	24,146	295	236	236	468	150	5,358	55,035	8
3549 Operat. Eng - detailed design/Contingency	7,244	7,244	88	71	71	140	45	1,607	16,510	2
6840 Operat. Eng - general const. supervision	24,146	24,146	295	236	236	468	150	5,358	55,035	8
6841 Operat. Eng - quality assurance	8,780	8,780	107	86	86	170	55	1,948	20,013	3
6842 Operat. Eng - surveying	2,195	2,195	27	21	21	43	14	487	5,003	1
6849 Operat. Eng - Residency Contingency	10,537	10,537	129	103	103	204	66	2,338	24,015	4
Operational Engineering Sub-total	77,049	77,049	940	752	752	1,494	480	17,096	175,611	26

Total Operational Const.& Eng.Costs

516,073	516,073	6,296	5,037	5,037	10,006	3,215	114,508	1,176,246	174
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Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South

Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**(2016 Dollars) **South Bonson Traffic Study****ACTIVITY Concept Design Cost Estimate**

CODE EST.DATE March, 2016

Conceptual Est.

Blk Est. # 6.14A

Version Sept.1, 200

DESCRIPTION \Length

Divison\site

Road Type

MR

800

MR

2

500

MR

400

MR

1250

MR

400

MR

2200

MR

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
File: Bonson Traffic Study\4.0 ENGINEERING DESIGN\4.3

Company MCSL
(2016 Dollars) South Bonson Traffic Study
ACTIVITY Concept Design Cost Estimate
CODE EST. DATE March, 2016

Conceptual Est.
Blk Est. # 6.14A
Version Sept.1, 2001

Divison\site
Road Type
\Length

	Opt. 2 - Signal at intersection of Harris Road / Airport Way	Opt. 2 - Signal at intersection of Bonson Road / Airport Way	Future Sidewalk from Airport Way to Fieldstone Walk	Future Sidewalk from Airport Way to Fraser Way	Future Sidewalk from Lasser Rd. to Bonson Rd.	Future Sidewalk from Sutton Ave. to Hammond Rd.	Bicycle from Fraser Way	Larute from On Harris Rd.	Bicycle from Golden Ear Way	4 laning
With Four lanes on	With Four lanes on	on Harris Rd.	on Harris Rd.	on Sutton Ave.	On Bonson Rd.	On Harris Rd.	Golden Ear Way			
Airport Way	Airport Way	on E & W Side	on E Side	on N Side	on both sides	on both sides	SB Ramps			
2	2	500	2	2	400	2	2	2	2200	MR
MR	MR	MR	MR	MR	MR	MR	MR	MR		

	2	800	2	800	2	500	2	400	2	1250	2	400	2	2200	MR
MR	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR	MR

	3500 DETAILED DESIGN	from 3510,3520,3540,3550,3570	78,021	68,447	12,577	7,330	7,330	972	559	227,263	402,500	60
3530 Geotech. Er - detailed design		4,910	4,308	792	461	461	61	35	14,303	25,332	4	
3539 Geotech. Er - Contingency		1,473	1,292	237	138	138	18	11	4,291	7,600	1	

	TOTAL DETAILED DESIGN COSTS	84,404	74,047	13,606	7,930	7,930	1,052	605	245,858	435,431	65
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	6800 RESIDENT ENGINEERING	0	0	0	0	0	0	0	0	520,269	
from 6810,6820,6840,6850,6860,6870	105,207	93,022	16,108	9,416	9,416	1,380	779	284,941	520,269		

	TOTAL RESIDENT ENG. COSTS	105,207	93,022	16,108	9,416	9,416	1,380	779	284,941	520,269	77
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	0	0	0	0	0	0	0	0	0	0	
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	0	0	0	0	0	0	0	0	0	0	
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	0	0	0	0	0	0	0	0	0	0	
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	PART 1 SUMMARY										
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	CONSTRUCTION	1,001,384	898,384	135,305	78,861	78,861	10,462	6,018	2,621,006	4,830,281	716
ENGINEERING & SUPERVISION		177,855	160,515	22,856	13,343	13,343	1,870	1,065	496,307	887,154	131
CONTRACTUAL CONTINGENCY		353,772	317,670	47,448	27,661	27,661	3,700	2,125	935,194	1,715,231	254
		0	0	0	0	0	0	0	0	0	0

	CONSTRUCTION COST TOTAL	1,533,011	1,376,569	205,610	119,865	119,865	16,032	9,207	4,052,507	7,432,666	1101
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	PROJECT MANAGEMENT										
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2060 Project Man - office costs wages	30,660	27,531	4,112	2,397	2,397	321	184	81,050	148,653	22
2062 Project Man - office costs - expenses	7,665	6,883	1,028	599	599	80	46	20,263	37,163	6
2063 Project Man - printing costs	0	0	0	0	0	0	0	0	0	0
2061 Project Man - general	0	0	0	0	0	0	0	0	0	0
Project Manager Sub-total	38,325	34,414	5,140	2,997	2,997	401	230	101,313	185,817	28

2010 Client - office costs wages	15,330	13,766	2,056	1,199	1,199	160	92	40,525	74,327	11
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2012 Client - office costs - expenses	7,665	6,883	1,028	599	599	80	46	20,263	37,163	6
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2030 Client - printing costs	0	0	0	0	0	0	0	0	0	0
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2011 Client - general	0	0	0	0	0	0	0	0	0	0
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Client Sub-total	22,995	20,649	3,084	1,798	1,798	240	138	60,788	111,490	17
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2070 Public Rel. - wages & expenses	0	0	0	0	0	0	0	0	0	0
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2072 Public Rel. - adv., media, displays	0	0	0	0	0	0	0	0	0	0
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2073 Public Rel. - opening ceremonies	0	0	0	0	0	0	0	0	0	0
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2071 Public Rel. - general	0	0	0	0	0	0	0	0	0	0
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Public Relations Sub-total	0	0	0	0	0	0	0	0	0	0
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2040 Legal Costs - lawyers fees	1,533	1,377	206	120	120	16	9	4,053	7,433	1
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2041 Legal Costs - general	0	0	0	0	0	0	0	0	0	0
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Legal Costs Sub-total	1,533	1,377	206	120	120	16	9	4,053	7,433	1
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2080 Insurance - const./ liability, E&O	0	0	0	0	0	0	0	0	0	0
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2081 Insurance - general	0	0	0	0	0	0	0	0	0	0
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Legal Costs Sub-total	0	0	0	0	0	0	0	0	0	0
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2099 Project Management Contingency	18,856	16,932	2,529	1,474	1,474	197	113	49,846	91,422	14
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TOTAL PROJECT MANAGEMENT COSTS	81,709	73,371	10,959	6,389	6,389	854	491	215,999	396,161	59
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Opt 2 - South Bonson

Total	Road Type
Line	1. 2ln Fron
Cost	2. 2ln Acc
	3. 4ln Acc
C/LM	4.R4L-4L E
	5.R2/3L-4L
	6.Retr.4L-4
6750	7.R4L-4LE
6750	8. New 4L

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
File: Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**
(2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est.
Blk Est. # 6.14A
Version Sept.1, 2001

Divison\site
Road Type

DESCRIPTION \Length

Estimated by: P. Nahal

O:\Proj\2121-00209-00 City of Pitt Meadows-South
File: Bonson Traffic Study\4.0 ENGINEERING DESIGN4.3

Company **MCSL**

(2016 Dollars) **South Bonson Traffic Study**
ACTIVITY Concept Design Cost Estimate
CODE EST.DATE March, 2016

Conceptual Est.	Divison\site	Opt. 2 - Signal at intersection of Harris Road / Airport Way	Opt. 2 - Signal at intersection of Bonson Road / Airport Way	Future Sidewalk from Airport Way to Fieldstone Walk	Future Sidewalk from Airport Way to Fraser Way	Future Sidewalk from Lasser Rd. to Bonson Rd.	Future Sidewalk from Sutton Ave. to Hammond Rd.	utre from Fraser Way	Bicycle from Airport Way to West of Golden Ear Way	Larute Bicycle Lan	4 laning
Blk Est. # 6.14A	Divison\site	With Four lanes on Airport Way	With Four lanes on Airport Way	on Harris Rd.	on Harris Rd.	on Sutton Ave.	On Bonson Rd.	On Harris Rd.	Golden Ear Way	SB Ramps	MR
Version Sept.1, 200	DESCRIPTION \Length	2 800	2 800	2 500	2 400	2 400	2 1250	2 400	2 2200	MR	OR
		MR	MR	MR	MR	MR	MR	MR	MR	MR	TR
PART 2 SUMMARY NON-CONSTRUCTION CC		0	0	0	0	0	0	0	0	0	
Non-Construction		62,853	56,439	8,430	4,914	4,914	657	378	166,153		
Non-Const. Contingency		18,856	16,932	2,529	1,474	1,474	197	113	49,846		
TOTAL NON-CONSTRUCTION CO:		81,709	73,371	10,959	6,389	6,389	854	491	215,999		
DIVISION TOTAL FOR ROAD TYPE		1,614,720	1,449,940	216,568	126,254	126,254	16,886	9,698	4,268,505		

Printing Date: 4/14/2016 Time: 9:19 AM

Opt 2 - South Bonson	Total	Road Type
	Traffic Study	Line 1. 2In Fron
	Road improvements	Cost 2. 2In Acc
	Construction Cost	3. 4In Acc
	Estimates	C/LM 4.R4L-4L E
	6750	5.R2/3L-4L
	0	6.Retr.4L-4
	6750	7.R4L-4LE
		8. New 4L
	304,739	45
	91,422	14
	396,161	59
	7,828,827	1160