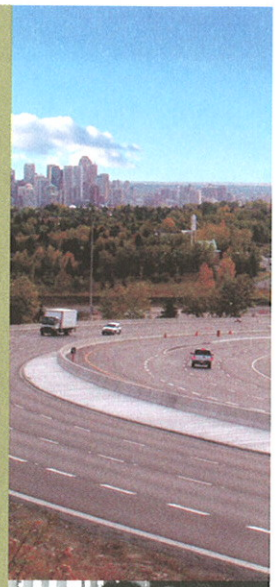
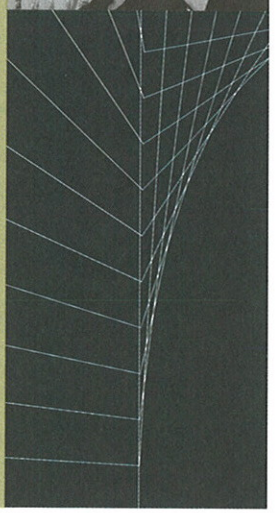
TRANSPORTATION MUNICIPAL/ENVIRONMENTAL STRUCTURAL
LAND DEVELOPMENT LANDSCAPE ARCHITECTURE
PLANNING/COMMUNICATIONS GIS/MAPPING





Iron Horse Holdings

Final Report

Medicine Valley Industrial Park Traffic Impact Assessment

June, 2009

ISL Engineering and Land Services

Table of Contents

Exhibits

Appendices

Tables

Corporate Authorization

This document entitled "Medicine Valley Industrial Park - Traffic Impact Assessment" has been prepared by ISL Engineering and Land Services Ltd. for the use of Iron Horse Holdings in support of the proposed light industrial development submitted to Alberta Transportation. The information and data provided herein represent ISL's professional judgment at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without the express written consent of ISL.

Alexander Ho, P.Eng.

PERMIT TO PRACTICE

ISL Engineering and Land Services Ltd.

Signature Peter Chadwick

Date July 8 /09

PERMIT NUMBER: P 4741

The Association of Professional Engineers, Geologists and Geophysicists of Alberta

1.0 Introduction

ISL Engineering & Land Services Ltd. was retained by Iron Horse Holdings to undertake a Traffic Impact Assessment in support of the Medicine Valley industrial development located in Lacombe County bordering on the north boundary of the Town of Eckville, Alberta. The proposed development consists of 38 acres of land and will be developed in two phases for light industrial use. The first phase of the development consists of about 22.2 acres and is expected to be built in 2009. The second phase consists of about 15.8 acres and is expected to be fully developed in 2011. As shown in Exhibit 1.1, an access to the development is proposed off the existing service road on Highway 766.

1.1 Study Objectives

The objectives of this study are to analyze the Highway 766 / Access in the 2009, 2011 and 2031 horizon background scenarios with and without the proposed development. Traffic signal, right turn, left turn and illumination warrants were also performed at the intersection at all three horizons. From the analyses, any road network improvements required to accommodate traffic demand have been identified.

1.2 Study Methodology

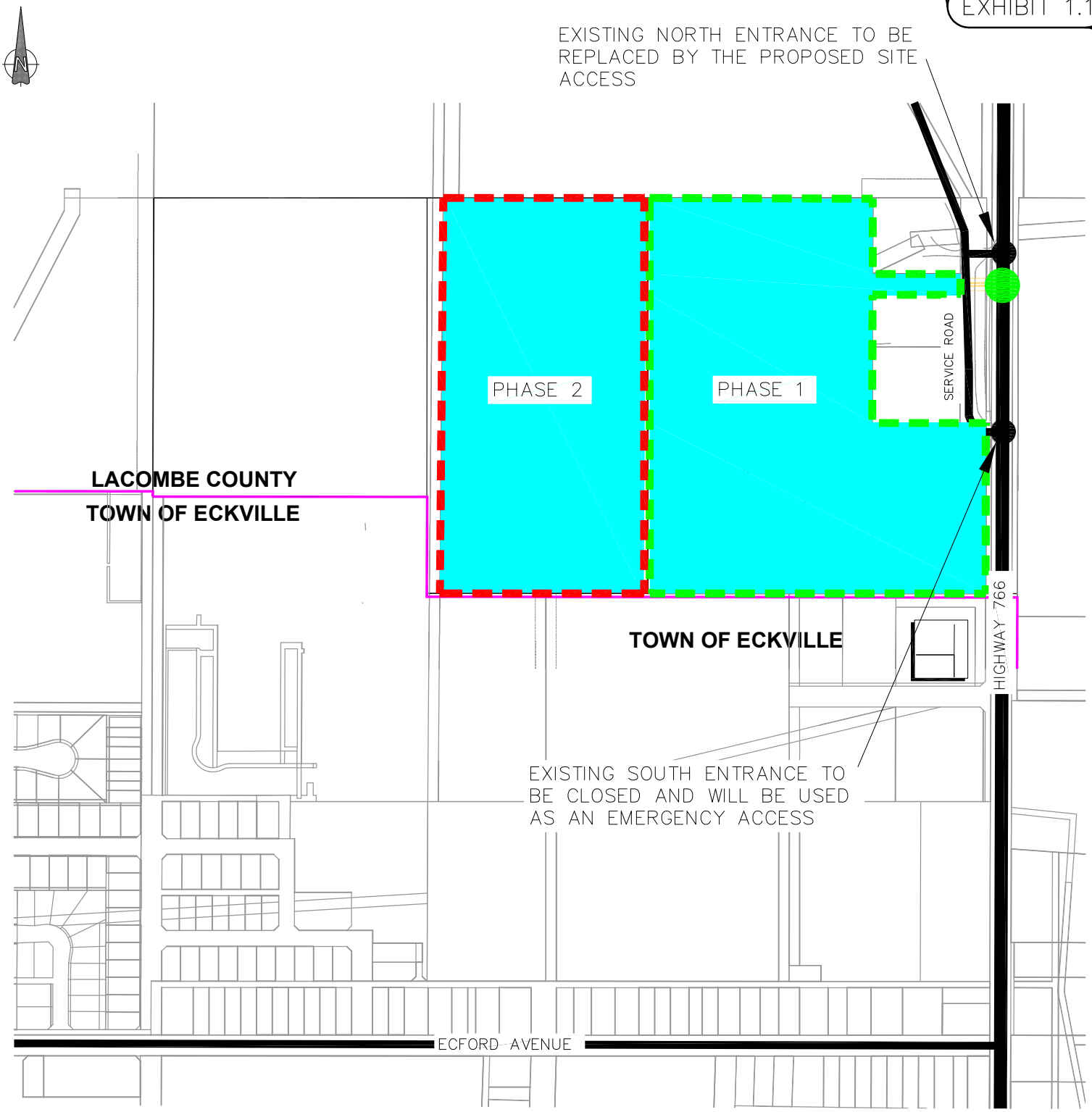
ISL referred to the information provided in the following resource documents:

- Alberta Transportation's (AT), "Highway Geometric Design Guide ", 1999
- AT "Traffic Impact Assessment Guideline", 2005
- Transportation Association of Canada (TAC), "Canadian Traffic Signal Warrant Matrix Procedure 2005"
- Transportation Association of Canada (TAC) "Illumination of Isolated Rural Intersections 2001"

The basic study methodology included the following tasks:

- Confirm scope of work with AT.
- Review background information within the study area.
- Conduct a traffic count at the Highway 766 / Access in the AM and PM peak hours.
- Apply the average Alberta highway growth rate of 2.5% (linear) to generate the 2011 and 2031 background traffic volumes.
- Estimate the trip generation of the proposed development.
- Analyze Scenario 1: 2009 horizon background traffic volumes.
- Analyze Scenario 2: 2009 horizon background traffic volumes and traffic volumes generated by Phase 1 of the development.
- Analyze Scenario 3: 2011 horizon background traffic volumes.
- Analyze Scenario 4: 2011 horizon background traffic volumes and traffic volumes generated by the Full Build-Out of the development.
- Analyze Scenario 5: 2031 horizon background traffic volumes.
- Analyze Scenario 6: 2031 horizon background traffic volumes and traffic volumes generated by the Full Build-Out of the development.
- Analyze proposed intersection operations and establish appropriate geometry based on AT Geometric Design Guide.
- Perform signalization, channelization, and illumination warrants.
- Document and report on the study findings.

EXHIBIT 1.1



LEGEND

PHASE 2 SITE BOUNDARY

PHASE 1 SITE BOUNDARY

EXISTING ENTRANCE

PROPOSED SITE ACCESS

ISL Engineering and Land Services

IRON HORSE HOLDINGS

MEDICINE VALLEY INDUSTRIAL PARK TIA

PROPOSED SITE PLAN

2.0 Data Collection

2.1 2009 Background Traffic Volumes

Manual traffic counts were conducted in the peak hours by ISL Engineering and Land Services Ltd. on May 26, 2009 (Tuesday) at both the north and south entrances of the existing service road on Highway 766. With the development, the existing north entrance onto the highway will be relocated approximately 12m to the south to align with the proposed development access. The existing south entrance will be blocked with a locked gate and serve as an emergency access. In this analysis, traffic from the south entrance will be re-assigned to the north entrance. The 2009 horizon background traffic volumes are shown in Exhibit 2.1.

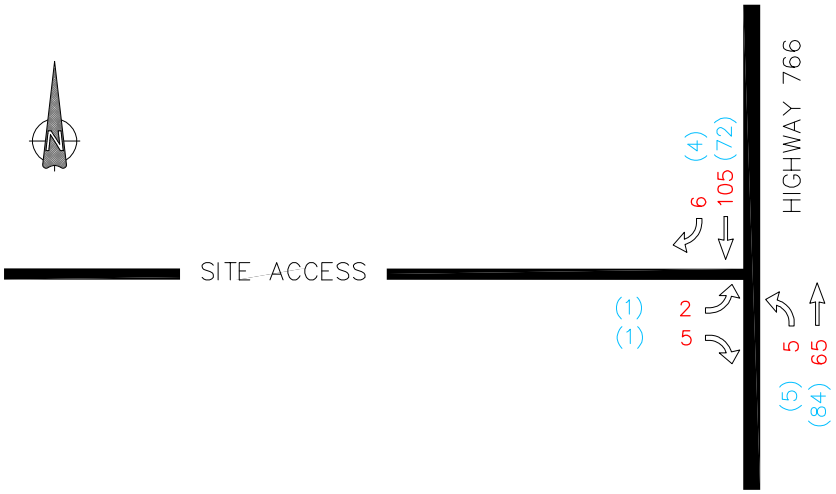
2.2 2011 and 2031 Horizons Background Traffic Volumes

The average Provincial Highway growth rate of 2.5% / year was used in this study to forecast both the 2011 and 2031 background traffic volumes. This growth rate was applied to both the northbound and southbound through traffic on Highway 766 only. The 2011 and 2031 background traffic volumes are shown in Exhibit 2.1.

2.3 Proposed Road Network

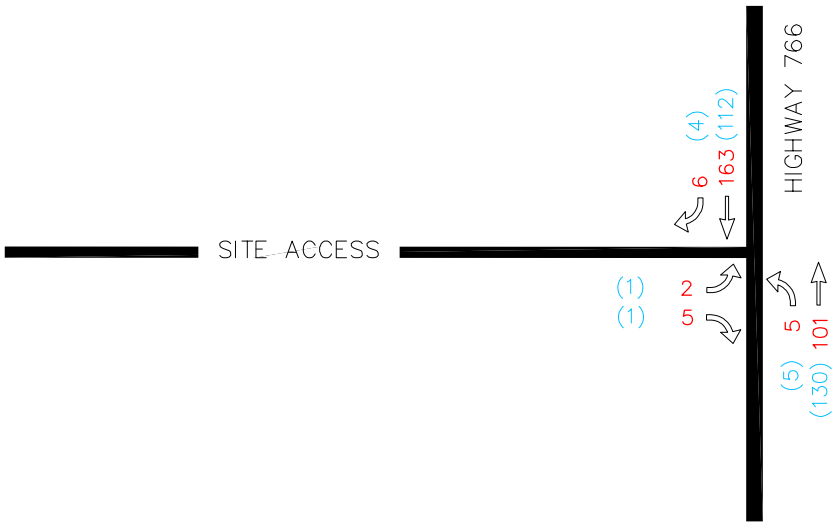
With the development, the proposed road network will be as described in Section 2.1 with only one access on Highway 766. Highway 766 and the site access road are two lane roadways with no left or right turning bays. The intersection is unsignalized and is free flow on Highway 766. In addition, the posted speed limit for Highway 766 is 80 km/h. The lane configuration and traffic control are shown in Exhibit 2.2.

EXHIBIT 2.1



2009 BACKGROUND

2011 BACKGROUND



2031 BACKGROUND

LEGEND

999 = AM PEAK

(999) = PM PEAK

ISL Engineering and Land Services

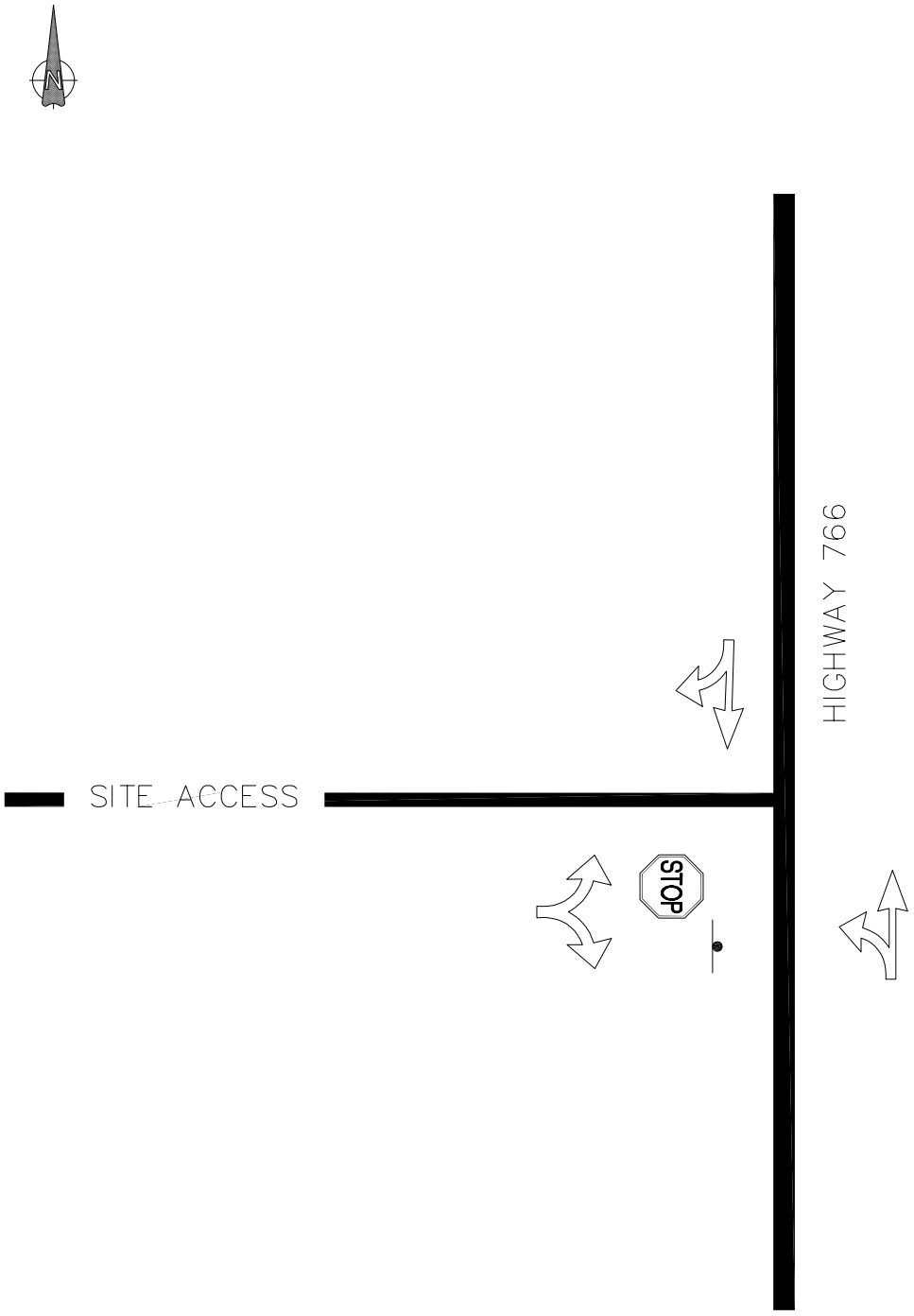
IRON HORSE HOLDINGS

MEDICINE VALLEY INDUSTRIAL PARK TIA

2009, 2011 & 2031 BACKGROUND

PEAK HOUR TRAFFIC VOLUMES

EXHIBIT 2.2



ISL Engineering and Land Services

IRON HORSE HOLDINGS

MEDICINE VALLEY INDUSTRIAL PARK TIA

LANE CONFIGURATION AND TRAFFIC CONTROL

3.0 Trip Generation and Distribution

3.1 Trip Generation

As confirmed in the scope of work, the trip generation of the light industrial land use was from a trip generation study of the Brochu Light Industrial development in Grande Prairie (conducted by ISL). The trip generation study concluded to the following trip generation rates:

- AM Peak: 2.58 trips / acre (66% In, 34% Out)
- PM Peak: 2.79 trips / acre (39% In, 61% Out)

The traffic volumes as generated by the Phase 1 and Phase 2 of the proposed development using the above rates are summarized in Table 3.1 below.

Table 3.1 Trip Generation

Land Use	Phase	Size (Acres)	AM Peak			PM Peak		
			Rate	Total Trips	Trips In/Out	Rate	Total Trips	Trips In/Out
Light Industrial	1	22.2	2.58 /Acre	57	38/19 (66%/34%)	2.79 /Acre	62	24/38 (39%/61%)
Light Industrial	2	15.8	2.58 /Acre	41	27/14 (66%/34%)	2.79 /Acre	44	17/27 (39%/61%)
Total		38.0		98	65/33		106	41/65

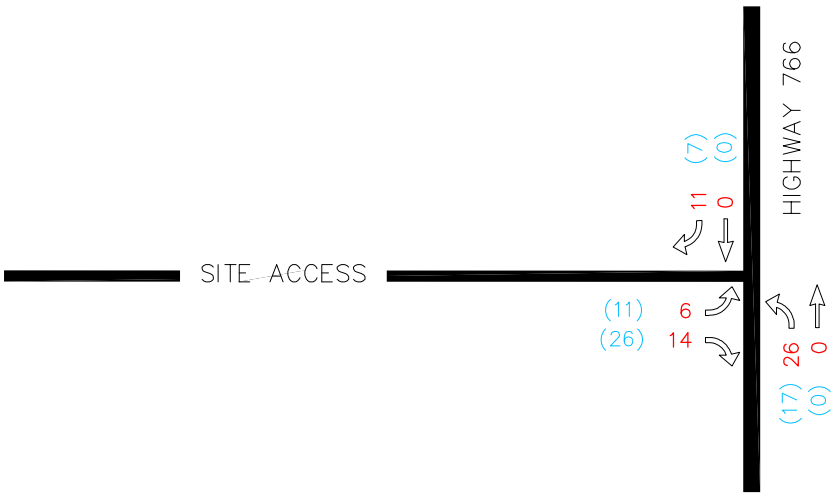
3.2 Trip Distribution

The trip distribution of the site-generated traffic is assumed to be 70%/30% (south/north) on Highway 766. This assumes 70% of the generated traffic comes from the Town of Eckville and 30% from the north. This rate was applied to the site generated traffic and the resulting volumes are shown in Exhibit 3.1.

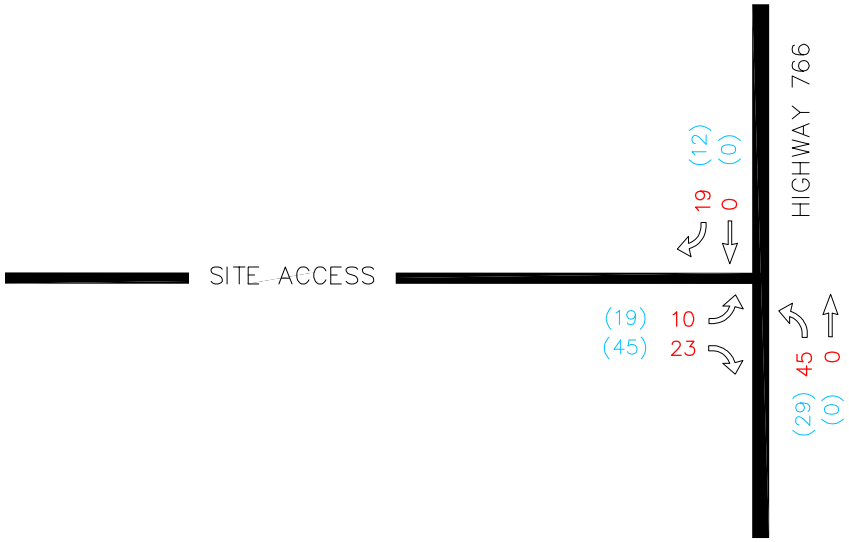
3.3 Final Trips

To generate the “background + development” volumes, the “background” volumes were added to the “development generated” volumes. The final volumes for the 2009, 2011 and 2031 scenarios are shown in Exhibit 3.2.

EXHIBIT 3.1



2009 PHASE 1 SITE GENERATED



2011 & 2031 FULL BUILD-OUT SITE GENERATED

LEGEND

999 = AM PEAK

(999) = PM PEAK

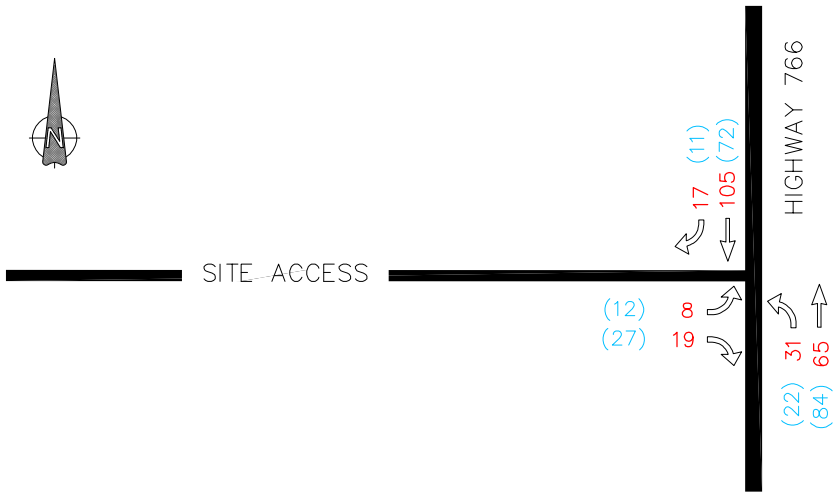
ISL Engineering and Land Services

IRON HORSE HOLDINGS

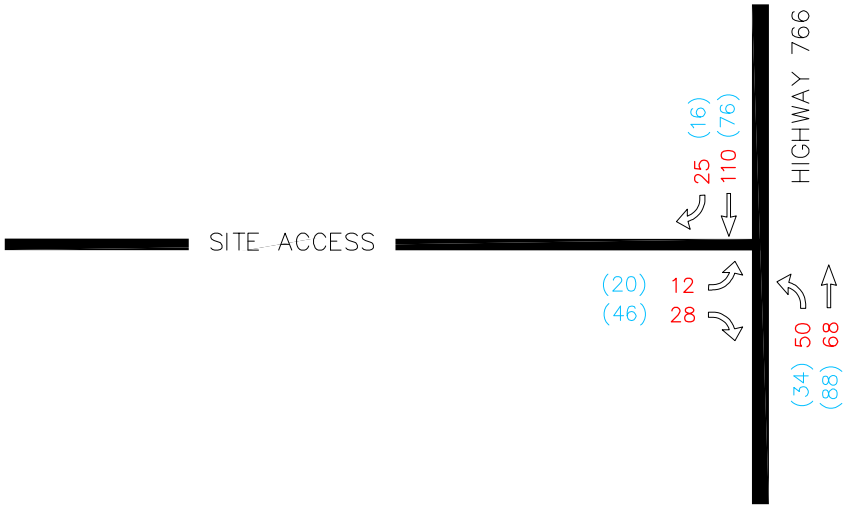
MEDICINE VALLEY INDUSTRIAL PARK TIA

2009, 2011 & 2031 SITE GENERATED PEAK HOUR TRAFFIC VOLUMES

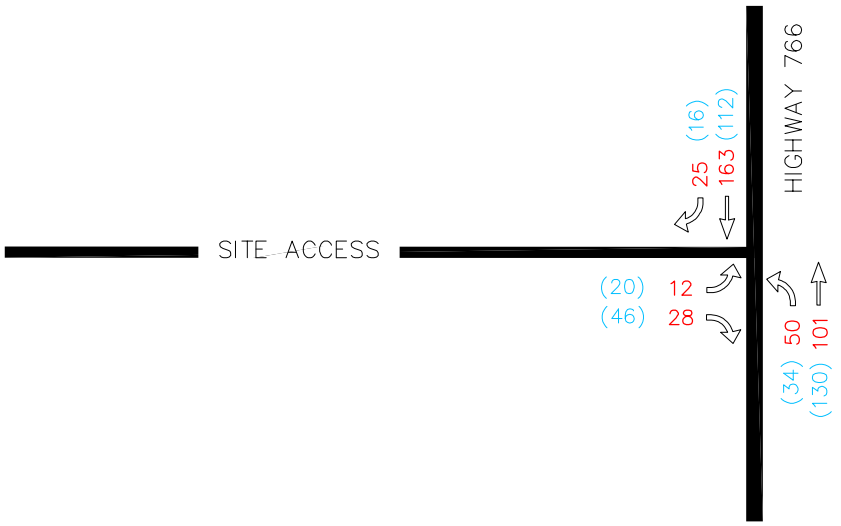
EXHIBIT 3.2



2009 FINAL



2011 FINAL



2031 FINAL

LEGEND

999 = AM PEAK

(999) = PM PEAK

ISL Engineering and Land Services

IRON HORSE HOLDINGS

MEDICINE VALLEY INDUSTRIAL PARK TIA

2009, 2011 & 2031 FINAL

PEAK HOUR TRAFFIC VOLUMES

4.0 Traffic Analysis

4.1 Synchro Analysis

The Synchro 7.0 computer analysis package was used to analyze the operational characteristics of the intersections. A Level of Operating Service (LOS) A represents the highest level of service or generally "free flowing conditions" while a LOS F generally represents a "breakdown" or "gridlock" condition in vehicular flow. There are varying degrees of delay and congestion introduced at the intermediate LOS B, C, D, and E levels. LOS D is representative of "normal" peak hour congestion, and is generally the accepted performance criterion for design analysis in rural areas. LOS E is representative of an intersection nearing its capacity, and may be accepted for certain movements only. Typically, a LOS D or less for all intersection movements is the accepted standard for peak hour operations in rural areas. The LOS for an unsignalized intersection is based on the average time delay per vehicle, as per Table 4.1 below.

Table 4.1 LOS Criteria for Unsignalized Intersections

LOS	Average Delay per Vehicle (s / veh)
A	< 10
B	10 – 15
C	15 – 25
D	25 – 35
E	35 – 50
F	> 50

Synchro also calculates each movement's volume to capacity ratio (v/c). A v/c ratio of 1.0 represents an intersection or movement at full capacity with no ability to facilitate extra vehicles. Typically, a v/c ratio of 0.85 or better for all intersection movements is the accepted standard for peak hour operations in rural areas.

Finally, Synchro also calculates the 95th percentile vehicle queue length for each intersection movement, which provides the criteria for left and right turn storage requirements. This queue length is exceeded 5% of the time, which is accepted practice for normal peak hour operation in rural areas.

The following scenarios were analyzed:
Scenario 1: 2009 Background
Scenario 2: 2009 Background + Phase 1 Site Generated Traffic
Scenario 3: 2011 Background
Scenario 4: 2011 Background + Full Build-Out Site Generated Traffic
Scenario 5: 2031 Background
Scenario 6: 2031 Background + Full Build-Out Site Generated Traffic

4.2 Scenario 1: 2009 Background

The lane configuration and traffic control as described in Section 2.3 was used in the analysis. The analysis results are shown in Appendix A and summarized in Table 4.2.

Table 4.2 Scenario 1 Synchro Results

INTERSECTION / MOVEMENT			SCENARIO 1					
			AM PEAK HOUR			PM PEAK HOUR		
			v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Hwy 766 / Site Access (Unsignalized)	EB	LT/RT	0.01	A	0.2	0.00	A	0.1
	NB	LT/TH	0.00	A	0.1	0.00	A	0.1
	SB	TH/RT	0.07	A	0.0	0.04	A	0.0

From Table 4.2, all intersections operate very well, with very good LOS and v/c ratios.

4.3 Scenario 2: 2009 Background + Phase 1 Development

In Scenario 2, the same lane configuration and traffic control in Scenario 1 was used. With the additional traffic volumes generated by Phase 1 of the proposed development, the results of the Synchro analysis are shown in Appendix A and summarized in Table 4.3.

Table 4.3 Scenario 2 Synchro Results

INTERSECTION / MOVEMENT			SCENARIO 2					
			AM PEAK HOUR			PM PEAK HOUR		
			v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Hwy 766 / Site Access (Unsignalized)	EB	LT/RT	0.03	A	0.8	0.04	A	1.1
	NB	LT/TH	0.02	A	0.5	0.02	A	0.4
	SB	TH/RT	0.07	A	0.0	0.05	A	0.0

From Table 4.3, the intersection remains operated at a very good LOS and v/c ratio similar to Scenario 1.

4.4 Scenario 3: 2011 Background

Scenario 3 was analyzed with the lane configuration and traffic control as described in Section 2.3. With the increased traffic volumes from the background growth, the intersection remained operating well. The results of the Synchro analysis are summarized in Table 4.4 below.

Table 4.4 Scenario 3 Synchro Results

INTERSECTION / MOVEMENT			SCENARIO 3					
			AM PEAK HOUR			PM PEAK HOUR		
			v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Hwy 766 / Site Access (Unsignalized)	EB	LT/RT	0.01	A	0.2	0.00	A	0.1
	NB	LT/TH	0.00	A	0.1	0.00	A	0.1
	SB	TH/RT	0.07	A	0.0	0.05	A	0.0

4.5 Scenario 4: 2011 Background + Full Build-Out Development

With the full build-out development traffic added onto the intersection, traffic remained operating at a very good LOS with low v/c. The results of the Synchro analysis are shown in Table 4.5 below.

Table 4.5 Scenario 4 Synchro Results

INTERSECTION / MOVEMENT			SCENARIO 4					
			AM PEAK HOUR			PM PEAK HOUR		
			v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Hwy 766 / Site Access (Unsignalized)	EB	LT/RT	0.05	A	1.2	0.08	A	1.9
	NB	LT/TH	0.04	A	0.9	0.02	A	0.6
	SB	TH/RT	0.08	A	0.0	0.05	A	0.0

4.6 Scenario 5: 2031 Background

Scenario 5 was analyzed with the lane configuration and traffic control as described in Section 2.3. With the increased traffic volumes from the background growth, the intersection remained operating well. The results of the Synchro analysis are summarized in Table 4.6 below.

Table 4.6 Scenario 5 Synchro Results

INTERSECTION / MOVEMENT			SCENARIO 5					
			AM PEAK HOUR			PM PEAK HOUR		
			v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Hwy 766 / Site Access (Unsignalized)	EB	LT/RT	0.01	A	0.2	0.00	A	0.1
	NB	LT/TH	0.00	A	0.1	0.00	A	0.1
	SB	TH/RT	0.10	A	0.0	0.07	A	0.0

4.7 Scenario 6: 2031 Background + Full Build-Out Development

With the full build-out development generated traffic and increased traffic volumes from the background growth added to the intersection, traffic remained operating at a very good LOS with low v/c. The results of the Synchro analysis are shown in Table 4.7.

Table 4.7 Scenario 6 Synchro Results

INTERSECTION / MOVEMENT			SCENARIO 6					
			AM PEAK HOUR			PM PEAK HOUR		
			v/c Ratio	LOS	Queue Length 95th (m)	v/c Ratio	LOS	Queue Length 95th (m)
Hwy 766 / Site Access (Unsignalized)	EB	LT/RT	0.05	B	1.3	0.08	A	2.0
	NB	LT/TH	0.04	A	0.9	0.02	A	0.6
	SB	TH/RT	0.11	A	0.0	0.08	A	0.0

From the Synchro analysis, it was found that the existing intersection will operate very well in the long term with the proposed development.

5.0 Warrant Analysis

Illumination, signal, left turn, and right turn warrant analyses were performed and the results are summarized in the following sections.

5.1 Traffic Signal Warrant

The "Canadian Traffic Signal Matrix Procedure 2005" by the Transportation Association of Canada was used to perform the signal warrant at the intersection of Highway 766 / Site Access for the scenarios with the proposed development:

- Scenario 2 (2009 Background + Phase 1 Development)
- Scenario 4 (2011 Background + Full Build-Out Development)
- Scenario 6 (2031 Background + Full Build-Out Development)

In the warrant analyses, no traffic signal is warranted for the intersection in all three scenarios mentioned above. This is consistent with the traffic control used in the Synchro analysis. The traffic signal warrant worksheets are shown in Appendix B and the results are summarized in Table 5.1 below.

Table 5.1 Signal Warrant Summary

Intersection	Method	Scenario 2	Scenario 4	Scenario 6
Hwy 766 / Site Access	**TAC Matrix**	Not Warranted	Not Warranted	Not Warranted
	Synchro	Not Warranted	Not Warranted	Not Warranted

5.2 Left Turn Warrant

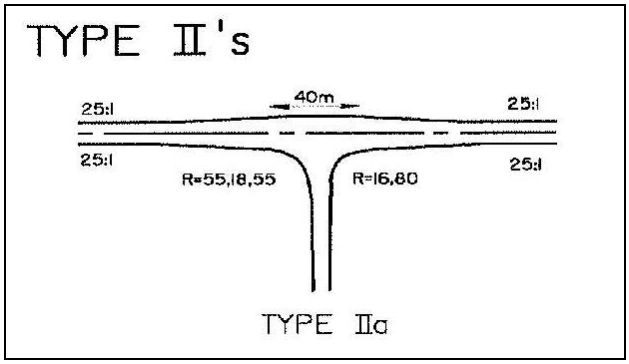
Tables from Section D D-7.6-5 (90 km/h Design Speed) in the AT Design Guide were used to complete the left turn warrants at the intersection in all the scenarios with the proposed development. The variables used in the warrant and the results of the warrant analysis are summarized in Table 5.2 below.

Table 5.2 Left Turn Warrant Summary

Intersection/ Movement	**Highway 766 / Site Access**		
	NBL		
Scenario	**2**	**4**	**6**
L_T Volume	31 (22)	50 (34)	50 (34)
L_T %	33% (21%)	42% (28%)	33% (21%)
V_A	96 (106)	119 (122)	151 (164)
V_O	122 (83)	136 (92)	188 (128)
Type	II (I)	II (I)	II (II)
Left Turn Bay Warranted?	No (No)	No (No)	No (No)

AM(PM)

From Table 5.2, Highway 766 / Access warrant a Type II intersection with no left turn bay (see below) in all three scenarios. Furthermore, this is consistent with the lane configuration as used in the Synchro analyses.



5.3 Right Turn Warrant

From Section D.7.7 in the AT Design Guide, all three conditions in Table 5.3 must be met to warrant an exclusive right turn lane on a 2 lane unsignalized highway. The analysis was done in the scenarios with the proposed development.

Table 5.3 Right Turn Warrant Summary

Conditions	**Highway 766 / Site Access SBR**		
Scenario	**2**	**4**	**6**
Main Road AADT > 1800	2040	2342	3157
Side Road AADT > 900	331	535	535
Right Turn Daily Volume 360	143	209	209
Warranted?	No	No	No

From Table 5.3, no right turn lane is warranted at the intersection in all scenarios.

5.4 Illumination Warrant

The "Illumination of Isolated Rural Intersections 2001" by the Transportation Association of Canada was used to perform the illumination warrant for Scenario 2, 4 and 6. From the analysis, no illumination is warranted for all three scenarios. Detailed illumination warrant results are shown in Appendix B.

6.0 Conclusions and Recommendations

The proposed full build-out of the Medicine Valley industrial Park generated a total of 98 trips and 106 trips in the AM peak and PM peak periods, respectively. In Phase 1, the development generated a total of 57 trips and 62 trips in the AM peak and PM peak periods, respectively.

These trips were combined with the background traffic volumes and analyzed. With the traffic generated by the proposed development, the Highway 766 / Access operated at a very good level of service that is similar to the background.

From the left turn warrant analyses in Section 5.2, a Type II intersection with no left turn bay is required in all three horizons. From the right turn, signal, and illumination warrants, no additional improvements were warranted.

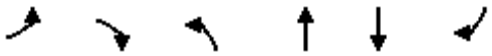
7.0 Closure

ISL Engineering and Land Services Ltd. has prepared this document entitled "Medicine Valley Industrial Park – Traffic Impact Assessment" for Iron Horse Holdings in support of the proposed light industrial development to Alberta Transportation. The material contained herein reflects ISL's best judgement in light of the information available at the time of the study and the level of detail normally expected at the preliminary planning stage.

Any use which a third party makes of this report or reliance on this report or decision made based on this report are the sole responsibility of such third parties. ISL accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made, or actions taken, based on this report.

Appendix A

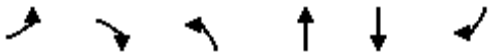
Synchro Results



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	5	5	65	105	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	5	5	65	105	6
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	183	108	111			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	183	108	111			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	99	100			
cM capacity (veh/h)	779	917	1413			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	7	70	111
Volume Left	2	5	0
Volume Right	5	0	6
cSH	873	1413	1700
Volume to Capacity	0.01	0.00	0.07
Queue Length 95th (m)	0.2	0.1	0.0
Control Delay (s)	9.2	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.6	0.0
Approach LOS	A		

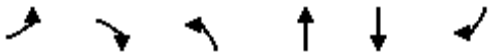
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	17.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	1	5	84	72	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	1	5	84	72	4
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	168	74	76			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	168	74	76			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	100			
cM capacity (veh/h)	795	958	1456			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	89	76
Volume Left	1	5	0
Volume Right	1	0	4
cSH	869	1456	1700
Volume to Capacity	0.00	0.00	0.04
Queue Length 95th (m)	0.1	0.1	0.0
Control Delay (s)	9.2	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.4	0.0
Approach LOS	A		

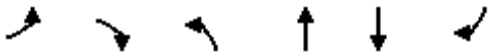
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	18.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	8	19	31	65	105	17
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	19	31	65	105	17
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	240	114	122			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	240	114	122			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	99	98	98			
cM capacity (veh/h)	708	910	1400			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	27	96	122
Volume Left	8	31	0
Volume Right	19	0	17
cSH	839	1400	1700
Volume to Capacity	0.03	0.02	0.07
Queue Length 95th (m)	0.8	0.5	0.0
Control Delay (s)	9.4	2.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.4	2.6	0.0
Approach LOS	A		

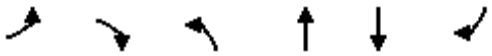
Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	12	27	22	84	72	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	27	22	84	72	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	206	78	83			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	206	78	83			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	98	97	98			
cM capacity (veh/h)	747	954	1447			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	39	106	83
Volume Left	12	22	0
Volume Right	27	0	11
cSH	879	1447	1700
Volume to Capacity	0.04	0.02	0.05
Queue Length 95th (m)	1.1	0.4	0.0
Control Delay (s)	9.3	1.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.3	1.7	0.0
Approach LOS	A		

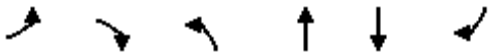
Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	5	5	68	110	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	5	5	68	110	6
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	191	113	116			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	191	113	116			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	99	100			
cM capacity (veh/h)	771	911	1407			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	7	73	116
Volume Left	2	5	0
Volume Right	5	0	6
cSH	866	1407	1700
Volume to Capacity	0.01	0.00	0.07
Queue Length 95th (m)	0.2	0.1	0.0
Control Delay (s)	9.2	0.5	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.5	0.0
Approach LOS	A		

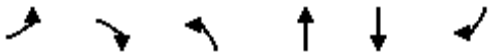
Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	17.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	1	5	88	76	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	1	5	88	76	4
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	176	78	80			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	176	78	80			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	100			
cM capacity (veh/h)	786	953	1451			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	93	80
Volume Left	1	5	0
Volume Right	1	0	4
cSH	862	1451	1700
Volume to Capacity	0.00	0.00	0.05
Queue Length 95th (m)	0.1	0.1	0.0
Control Delay (s)	9.2	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.2	0.4	0.0
Approach LOS	A		

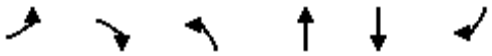
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	19.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	12	28	50	68	110	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	28	50	68	110	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	290	122	135			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	290	122	135			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	98	97	96			
cM capacity (veh/h)	653	900	1384			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	118	135
Volume Left	12	50	0
Volume Right	28	0	25
cSH	808	1384	1700
Volume to Capacity	0.05	0.04	0.08
Queue Length 95th (m)	1.2	0.9	0.0
Control Delay (s)	9.7	3.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.7	3.4	0.0
Approach LOS	A		

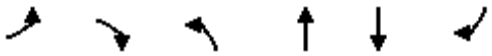
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	46	34	88	76	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	46	34	88	76	16
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	240	84	92			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	240	84	92			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	97	95	98			
cM capacity (veh/h)	708	946	1436			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	66	122	92
Volume Left	20	34	0
Volume Right	46	0	16
cSH	858	1436	1700
Volume to Capacity	0.08	0.02	0.05
Queue Length 95th (m)	1.9	0.6	0.0
Control Delay (s)	9.5	2.2	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	2.2	0.0
Approach LOS	A		

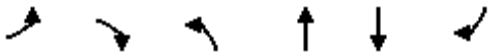
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	24.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	2	5	5	101	163	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	2	5	5	101	163	6
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	277	166	169			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	277	166	169			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	99	100			
cM capacity (veh/h)	687	850	1344			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	7	106	169
Volume Left	2	5	0
Volume Right	5	0	6
cSH	796	1344	1700
Volume to Capacity	0.01	0.00	0.10
Queue Length 95th (m)	0.2	0.1	0.0
Control Delay (s)	9.6	0.4	0.0
Lane LOS	A	A	
Approach Delay (s)	9.6	0.4	0.0
Approach LOS	A		

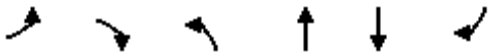
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	19.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	1	1	5	130	112	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1	1	5	130	112	4
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	254	114	116			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	254	114	116			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	100	100	100			
cM capacity (veh/h)	709	910	1407			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	2	135	116
Volume Left	1	5	0
Volume Right	1	0	4
cSH	797	1407	1700
Volume to Capacity	0.00	0.00	0.07
Queue Length 95th (m)	0.1	0.1	0.0
Control Delay (s)	9.5	0.3	0.0
Lane LOS	A	A	
Approach Delay (s)	9.5	0.3	0.0
Approach LOS	A		

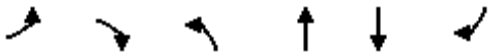
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	21.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	12	28	50	101	163	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	12	28	50	101	163	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	376	176	188			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	376	176	188			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	98	97	96			
cM capacity (veh/h)	581	840	1323			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	151	188
Volume Left	12	50	0
Volume Right	28	0	25
cSH	741	1323	1700
Volume to Capacity	0.05	0.04	0.11
Queue Length 95th (m)	1.3	0.9	0.0
Control Delay (s)	10.1	2.8	0.0
Lane LOS	B	A	
Approach Delay (s)	10.1	2.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	46	34	130	112	16
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	20	46	34	130	112	16
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	318	120	128			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	318	120	128			
tC, single (s)	6.5	6.3	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.4	2.3			
p0 queue free %	97	95	98			
cM capacity (veh/h)	637	903	1393			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	66	164	128
Volume Left	20	34	0
Volume Right	46	0	16
cSH	801	1393	1700
Volume to Capacity	0.08	0.02	0.08
Queue Length 95th (m)	2.0	0.6	0.0
Control Delay (s)	9.9	1.7	0.0
Lane LOS	A	A	
Approach Delay (s)	9.9	1.7	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix B

Warrant Analyses

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Highway 766**	**Direction (EW or NS)**	**NS**	**Date:**	**Jun 03, 2009**
Side Street (name)	**Site Access**	**Direction (EW or NS)**	**EW**	**City:**	**Town of Eckville, AB**
Quadrant (if appl)					

Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes	
Highway 766	NB		1					1	
Highway 766	SB				1			1	
Site Access	WB								
Site Access	EB			1					

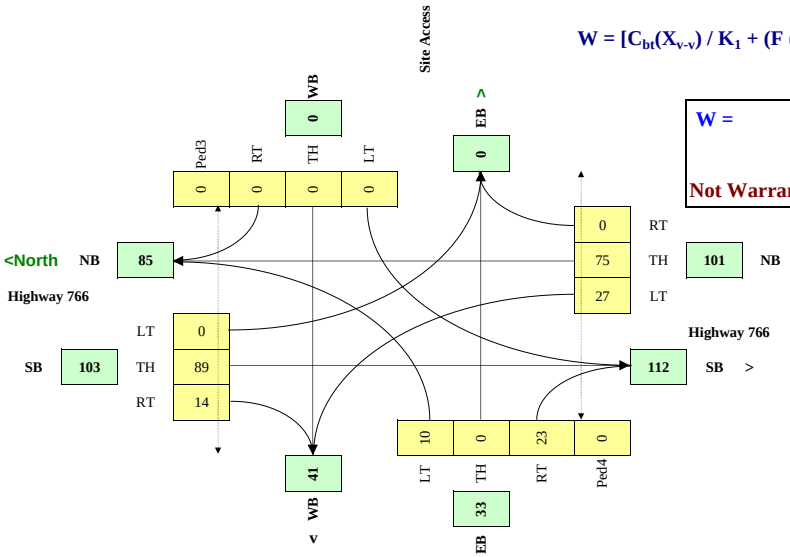
Demographics		
Elementary School	(y/n)	N
Senior's Complex	(y/n)	N
Pathway to School	(y/n)	N
Metro Area Population	(#)	1200
Central Business District	(y/n)	N

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Highway 766	NS	80	13.0%	N	0.0
Site Access	EW		13.0%	N	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S side**
7:30 - 8:30	31	65	0	0	105	17	0	0	0	8	0	19				
8:30 - 9:30	31	65	0	0	105	17	0	0	0	8	0	19				
11:30 - 12:30	27	75	0	0	89	14	0	0	0	10	0	23				
12:30 - 13:30	27	75	0	0	89	14	0	0	0	10	0	23				
16:00 - 17:00	22	84	0	0	72	11	0	0	0	12	0	27				
17:00 - 18:00	22	84	0	0	72	11	0	0	0	12	0	27				
Total (6-hour peak)	**159**	**447**	**0**	**0**	**531**	**84**	**0**	**0**	**0**	**60**	**0**	**138**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**27**	**75**	**0**	**0**	**89**	**14**	**0**	**0**	**0**	**10**	**0**	**23**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	**4**	**4**	**0**
		Veh	***Ped***

Not Warranted - Vs<75

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Highway 766**	**Direction (EW or NS)**	**NS**	**Date:**	**Jun 03, 2009**
Side Street (name)	**Site Access**	**Direction (EW or NS)**	**EW**	**City:**	**Town of Eckville, AB**
Quadrant (if appl)					

Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes	
Highway 766	NB		1					1	
Highway 766	SB				1			1	
Site Access	WB								
Site Access	EB			1					

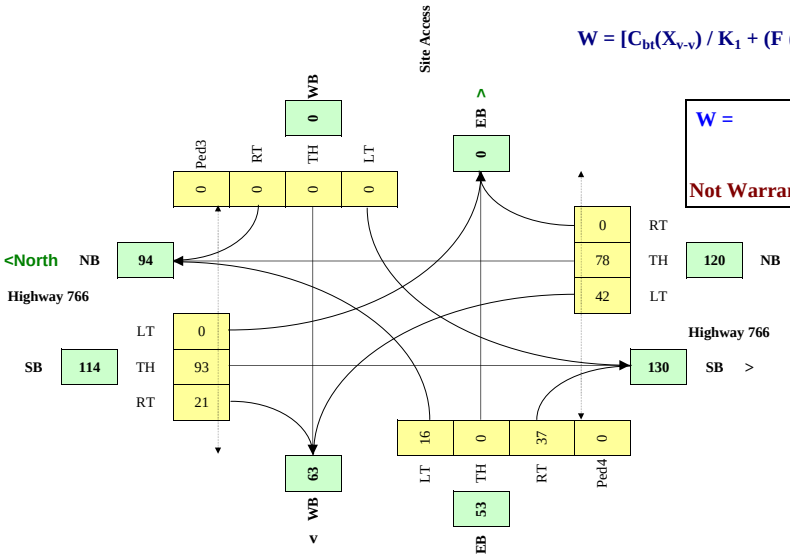
Demographics		
Elementary School	(y/n)	N
Senior's Complex	(y/n)	N
Pathway to School	(y/n)	N
Metro Area Population	(#)	1200
Central Business District	(y/n)	N

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Highway 766	NS	80	13.0%	N	0.0
Site Access	EW		13.0%	N	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S side**
7:30 - 8:30	50	68	0	0	110	25	0	0	0	12	0	28				
8:30 - 9:30	50	68	0	0	110	25	0	0	0	12	0	28				
11:30 - 12:30	42	78	0	0	93	21	0	0	0	16	0	37				
12:30 - 13:30	42	78	0	0	93	21	0	0	0	16	0	37				
16:00 - 17:00	34	88	0	0	76	16	0	0	0	20	0	46				
17:00 - 18:00	34	88	0	0	76	16	0	0	0	20	0	46				
Total (6-hour peak)	**252**	**468**	**0**	**0**	**558**	**123**	**0**	**0**	**0**	**96**	**0**	**222**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**42**	**78**	**0**	**0**	**93**	**21**	**0**	**0**	**0**	**16**	**0**	**37**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	8	8	0
		Veh	*Ped*

Not Warranted - Vs<75

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Highway 766**	**Direction (EW or NS)**	**NS**	**Date:**	**Jun 03, 2009**
Side Street (name)	**Site Access**	**Direction (EW or NS)**	**EW**	**City:**	**Town of Eckville, AB**
Quadrant (if appl)					

Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes	
Highway 766	NB		1					1	
Highway 766	SB				1			1	
Site Access	WB								
Site Access	EB			1					

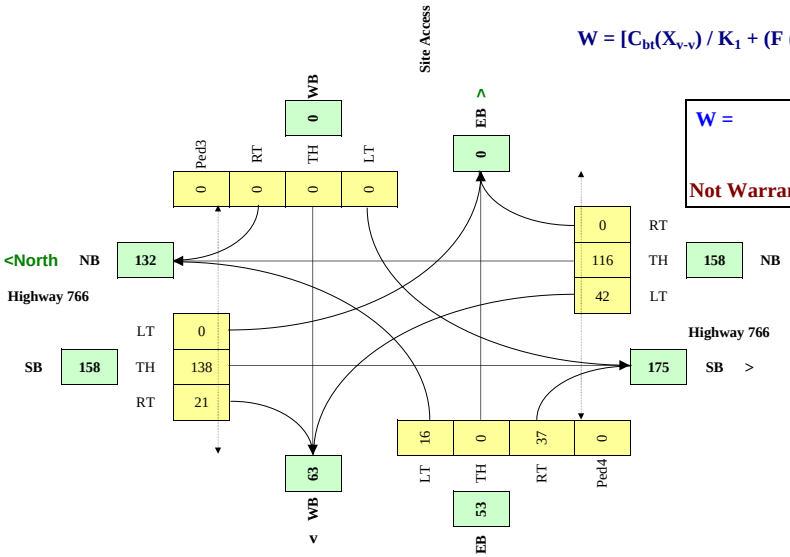
Demographics		
Elementary School	(y/n)	N
Senior's Complex	(y/n)	N
Pathway to School	(y/n)	N
Metro Area Population	(#)	1200
Central Business District	(y/n)	N

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Highway 766	NS	80	13.0%	N	0.0
Site Access	EW		13.0%	N	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**W Side**	**E Side**	**N Side**	**S side**
7:30 - 8:30	50	101	0	0	163	25	0	0	0	12	0	28				
8:30 - 9:30	50	101	0	0	163	25	0	0	0	12	0	28				
11:30 - 12:30	42	116	0	0	138	21	0	0	0	16	0	37				
12:30 - 13:30	42	116	0	0	138	21	0	0	0	16	0	37				
16:00 - 17:00	34	130	0	0	112	16	0	0	0	20	0	46				
17:00 - 18:00	34	130	0	0	112	16	0	0	0	20	0	46				
Total (6-hour peak)	**252**	**693**	**0**	**0**	**825**	**123**	**0**	**0**	**0**	**96**	**0**	**222**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**42**	**116**	**0**	**0**	**138**	**21**	**0**	**0**	**0**	**16**	**0**	**37**	**0**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W = 11 11 0

Veh Ped

Not Warranted - Vs<75

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections* , Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 766	Main Road	**Date**	June 3, 2009
Site Access	Minor Road	**Other**	2009 Background + Development
Eckville, Alberta	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	n				OK	
Highest operating speed on raised, channelized approach (km/h)	80		5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	2.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
					Geometric Factors Subtotal	**3**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	2040	2	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	20
AADT on Minor Road (2-way)	535	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	50	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	3
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	**63**

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections* , Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 766	Main Road	**Date**	June 3, 2009
Site Access	Minor Road	**Other**	2011 Background + Development
Eckville, Alberta	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	n				OK	
Highest operating speed on raised, channelized approach (km/h)	80		5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	2.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
					Geometric Factors Subtotal	**3**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	2342	2	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	20
AADT on Minor Road (2-way)	535	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	50	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	**60**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	3
Operational Factor Subtotal	60
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	**63**

Illumination of Isolated Rural Intersections
LIGHTING WARRANT SPREADSHEET

This spreadsheet is to be used in conjunction with *Illumination of Isolated Rural Intersections* , Transportation Association of Canada, February 2001.

Please enter information in the cells with yellow background

INTERSECTION CHARACTERISTICS

Highway 766	Main Road	**Date**	June 3, 2009
Site Access	Minor Road	**Other**	2031 Background + Development
Eckville, Alberta	City/Town		

GEOMETRIC FACTORS

	Value	Rating	Weight	Comments	Check	Score
Channelization Rating	Descriptive	0		Refer to Table 1(A) to determine rating value	OK	
Presence of raised channelization? (Y / N)	n				OK	
Highest operating speed on raised, channelized approach (km/h)	80		5		OK	
Channelization Factor					OK	0
Approach Sight Distance on most constrained approach (%)	100	0	10	Relative to the recommended minimum sight distance	OK	0
Posted Speed limit (in 10's of km/h)	80				OK	
Radius of Horizontal Curve (m)	T			Enter "T" for tangent (no horizontal curve at the intersection)	OK	
Posted Speed Category =		0				
Posted Speed Category =		0				
Posted Speed Category =	C	0				
Posted Speed Category =		0				
Horizontal Curvature Factor		0	5		OK	0
Angle of Intersection (10's of Degrees)	90	0	5		OK	0
Downhill Approach Grade (x.x%)	2.0	0	3	Rounded to nearest tenth of a percent	OK	0
Number of Intersection Legs	3	1	3	Number of legs = 3 or more	OK	3
					Geometric Factors Subtotal	**3**

OPERATIONAL FACTORS

Is the intersection signalized ? (Y/ N)	n			Calculate the Signalization Warrant Factor		
AADT on Major Road (2-way)	3157	3	10	Either Use the two AADT inputs **OR** the Descriptive Signalization Warrant (Unused values should be set to Zero) Refer to Table 1(B) for description and rating values for signalization warrant.	OK	30
AADT on Minor Road (2-way)	535	1	20		OK	20
Signalization Warrant	Descriptive	0	30		OK	0
					OK	
Night-Time Hourly Pedestrian Volume	0	0	10	Refer to Table 1(B), note #2, to account for children and seniors	OK	0
Intersecting Roadway Classification	Descriptive	1	5	Refer to Table 1(B) for ratings.	OK	5
Operating Speed or Posted Speed on Major Road (km/h)	80	3	5	Refer to Table 1(B), note #3	OK	15
Operating Speed on Minor Road (km/h)	50	0	5	Refer to Table 1(B), note #3	OK	0
					Operational Factors Subtotal	**70**

ENVIRONMENTAL FACTOR

Lighted Developments within 150 m radius of intersection	0	0	5	Maximum of 4 quadrants	OK	0
					Environmental Factor Subtotal	**0**

COLLISION HISTORY

Average Annual night-time collision frequency due to inadequate lighting (collisions/yr, rounded to nearest whole #)	0.0	0	0	Enter **either** the annual frequency (See Table 1(C), note #4)	OK	0
OR				**OR** the number of collisions / MEV		
Collision Rate over last 3 years, due to inadequate lighting (/MEV)	0	0	0	(Unused values should be set to Zero)	OK	0
Is the average ratio of **all** night to day collisions >= 1.5 (Y/N)	n	0			OK	
					OK	
					Collision History Subtotal	**0**

Check Intersection Signalization:
Intersection is not Signalized

LIGHTING IS NOT WARRANTED

SUMMARY	
Geometric Factors Subtotal	3
Operational Factor Subtotal	70
Environmental Factor Subtotal	0
Collision History Subtotal	0
TOTAL POINTS	**73**