Bearspaw ASP Update
Transportation Network Analysis

Rocky View County



WATT CONSULTING GROUP
SEPTEMBER 17, 2024

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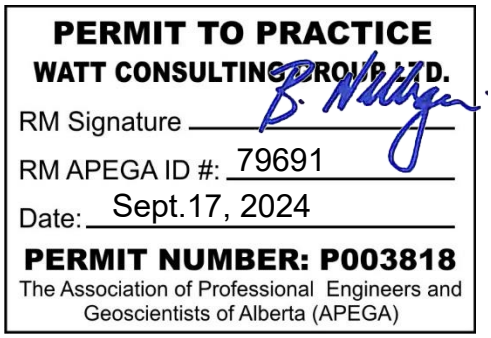
BEARSPAW ASP UPDATE

Transportation Network Analysis



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GLOSSARY OF TERMS

GENERAL	
All-Way-Stop Control	AWSC
Average Annual Daily Traffic	AADT
Average Annual Weekday Traffic	AAWT
Equivalent Adult Units	EAU
Institute of Transportation Engineers	ITE
Right-In-Right-Out	RIRO
Right-of-Way	ROW
Traffic Analysis Zone	TAZ
Transportation Association of Canada	TAC
Two-Way-Stop Control	TWSC
ANALYSIS RELATED	
Inbound	IB
Level of Service	LOS
Outbound	OB
Volume to Capacity	v/c
REPORT TYPE	
Area Structure Plan	ASP
Neighborhood Structure Plan	NSP
Transportation Impact Assessment	TIA
Transportation Master Plan	TMP

EXECUTIVE SUMMARY

WATT Consulting Group was retained by Rocky View County to provide a Transportation Network Analysis for the Bearspaw Area Structure Plan. The purpose of this report is to outline the results of forecasting future traffic volumes and to identify the future transportation network required to support full build-out of the proposed land uses.

Scope

The scope of this network review includes the following:

- Traffic forecasting and capacity analysis – 2035 and 2045 horizons;
- Road network review – based on the projected traffic volumes, determine the recommended classifications, number of lanes and right-of-way requirements for the road network; and
- Long-term road network concept – based on the capacity analysis and road network review, develop a long-term road network concept for the study intersections and roadways.

Results and Recommendations

Capacity analysis was conducted on the study intersections. Based on this assessment, the following transportation network improvements were identified as being required for each study horizon to support the full build-out of the proposed land uses.

Analysis Results and Recommendations	

2035 Horizon	• Highway 1A / Bearspaw Road
	  ○ Dual southbound left turn lanes
	  ○ Protected phase for southbound left turn
	• Highway 1A / Woodland Road
	  ○ Signalization
	  ○ Permitted-protected phase for eastbound and westbound left turns
	• Highway 1A / Lochend Road
	  ○ Signalization

Analysis Results and Recommendations	

2045 Horizon	• Highway 1A / Bearspaw Road
	  ○ Three eastbound and westbound through lanes
	  ○ Protected phase for eastbound and westbound left turn
	• Highway 1A / Woodland Road
	  ○ Three eastbound and westbound through lanes
	  ○ Protected phase for eastbound and westbound left turn
	  ○ Dedicated southbound left turn lane
	  ○ Permitted-protected phase for southbound left turn
	• Highway 1A / Lochend Road
	  ○ Three eastbound and westbound through lanes
	  ○ Protected phase for eastbound and westbound left turn
	• Burma Road / Bearspaw Road
	  ○ Signalization

1.0 INTRODUCTION

1.1 Background

The Bearspaw Area Structure Plan (ASP) encompasses approximately 25,000 acres of land in central west Rocky View County (RVC), adjacent to the Cities of Calgary and Cochrane. The ASP is a long-term planning document that outlines a vision for the future physical development of the area with regards to land use, transportation, protection of the natural environment, emergency services, general design, utility servicing and other planning issues. The current ASP was adopted in 1994. Since the completion of the Bearspaw ASP in 1994, there are many documents that have been approved including the County Plan, Glenbow Ranch ASP, the County Servicing Plan, the Interim Growth Plan, and the Interim Regional Evaluation Framework (IREF). This ASP will be aligned with the applicable documents and the requirements outlined in the Growth Plan developed by the Calgary Metropolitan Region Board[1].

WATT Consulting Group (WATT) was retained by RVC to complete a Transportation Network Review to review the impacts of the proposed land uses in the Bearspaw area on the transportation network.

1.2 Study Objectives

The primary objective of this study is to forecast future traffic volumes and to identify the ultimate transportation network required to support full build-out of the proposed land uses. The results of the study will provide RVC with information related to potential long-term transportation improvements required to support the Bearspaw ASP. More detailed Transportation Impact Assessments (TIA's) will still be required when development applications are submitted within the Bearspaw ASP. These TIA's can be used to identify the transportation infrastructure required to support individual development applications and provide guidance on timing and staging of the off-site improvements.

[1] Calgary Metropolitan Region Board, Growth Plan, August 15, 2022, https://www.calgarymetroregion.ca/growth-and-servicing-plan

1.3 Study Area

The Bearspaw ASP is bounded by Highway 1A to the south, the City of Calgary to the southeast, and the Town of Cochrane to the southwest. The study area is shown in **Figure 1**.

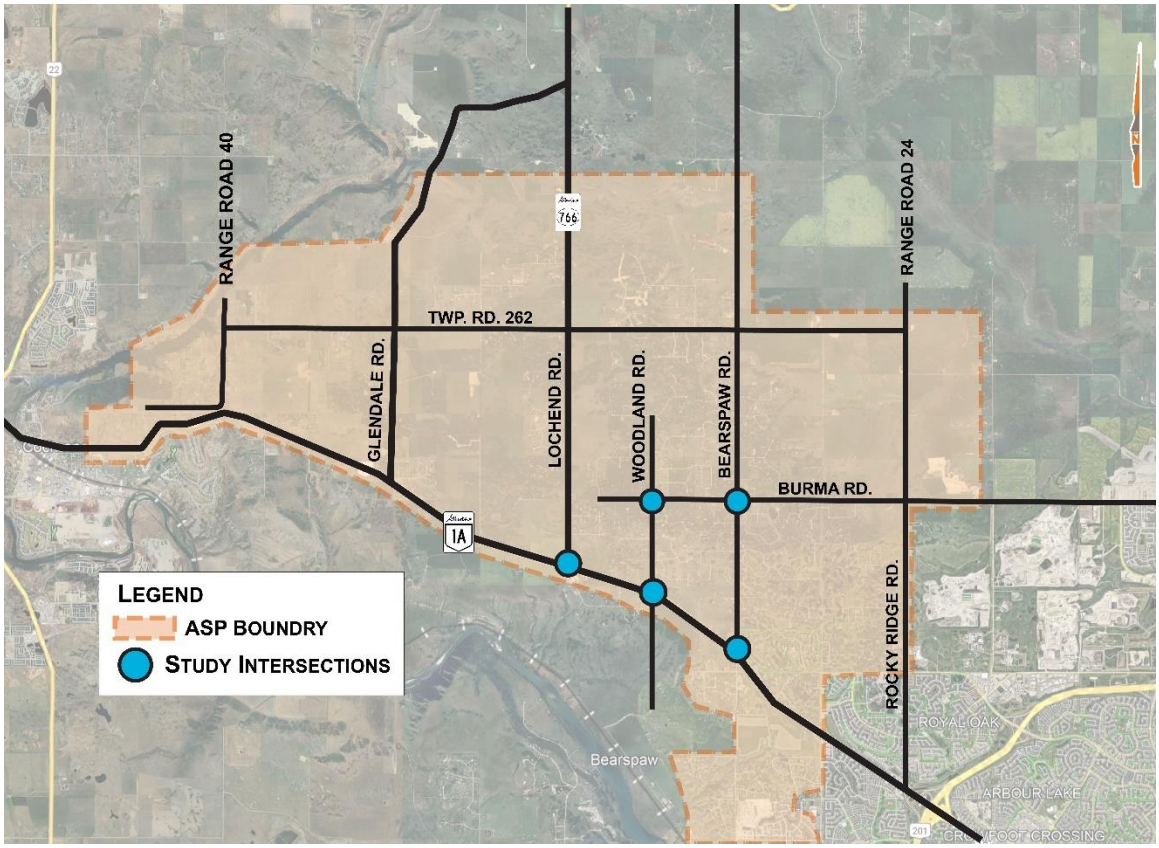


Figure 1: Study Area

1.4 Scope

A scope of work for the transportation analysis was developed in consultation with RVC staff members and included the following major tasks:

1) Review existing plans and background documents for the area.
2) Develop a traffic forecast model for the 2035 (50% build-out of Country Residential policy areas) and the 2045 (100% build-out of Country Residential policy areas) horizon years using WATT's 2040 RVC traffic model.

3) Complete a capacity analysis for the five study intersections for the 2035 and 2045 horizon years.

4) Identify the transportation network required to support full build-out of the Bearspaw ASP including the road classification, number of lanes, and right-of-way requirements for the study road network.

5) Develop a long-term road network concept of the study intersections and roadways in the Bearspaw ASP area.

2.0 EXISTING TRANSPORTATION NETWORK

2.1 Existing Road Network

There are several transportation corridors within and along the boundaries of the Bearspaw ASP. It should be noted that the study area includes transportation corridors that are under the control of two different road authorities including RVC and Alberta Transportation and Economic Corridors (ATEC). A brief description of each of the major roads that form the transportation network that services the Bearspaw ASP is provided below.

- **Highway 1A** is a provincial highway under the authority of ATEC. It provides two travel lanes in each direction and the posted speed limit varies between 90 km/h and 100 km/h throughout the study area. According to ATEC's highway classification system, it is classified as a Level 3 highway.

- **Rocky Ridge Road** is a paved arterial road with two lanes (one lane in each direction) north of Country Hills Boulevard and four lanes (two lanes in each direction) south of Country Hills Boulevard. The posted speed limit varies between 60 km/h and 70 km/h throughout the study area.

- **Burma Road (Township Road 260 / 144 Avenue NW)** is a paved two-lane arterial road between Symons Valley Road NW and Woodland Way. The posted speed limit is 80 km/h within the study area.

- **Bearspaw Road (Range Road 30)** is a paved two-lane arterial road between Highway 567 (Big Hill Springs Road) and Highway 1A. It primarily services the Bearspaw area. The posted speed limit is 80 km/h within the study area.
- **Woodland Road (Range Road 31)** is a paved two-lane arterial road that primarily services the Bearspaw area. The posted speed limit is 80 km/h within the study area.
- **Lochend Road (Highway 766)** is a provincial highway under the authority of ATEC. It provides two travel lanes in each direction and the posted speed limit is 100 km/h within the study area. According to ATEC's highway classification system, it is classified as a Level 3 highway.
- **Range Road 40** is a paved two-lane arterial road with one travel lane in each direction. The posted speed limit varies between 50 km/h and 80 km/h throughout the study area.
- **Township Road 262** is a paved two-lane arterial road between Range Road 40 and Range Road 24. The posted speed limit is 80 km/h within the study area.

The existing transportation network, including the number of lanes on each roadway, within the Bearspaw ASP is shown in **Figure 2**.

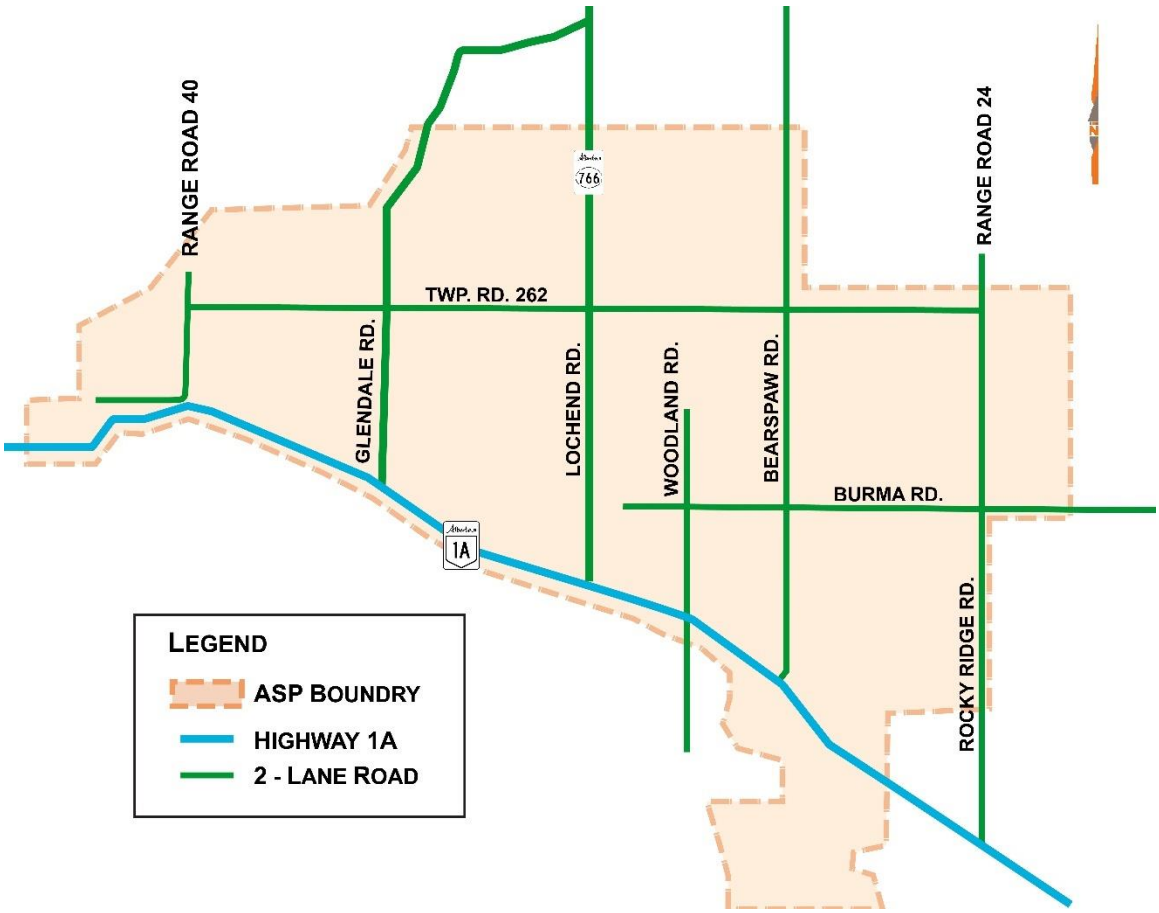


Figure 2: Existing Transportation Network

The study intersections for this Network Analysis are as follows:

- Highway 1A / Bearspaw Road
- Highway 1A / Woodland Road
- Highway 1A / Lochend Road
- Burma Road / Bearspaw Road
- Burma Road / Woodland Road

A detailed description of the existing characteristics of each study intersection is provided in **Table 1**, accompanied by the existing lane configuration and intersection control in **Figure 3**.

Table 1: Study Intersections Overview

Intersection	Control Type	Features	Crosswalks
Highway 1A / Bearspaw Road	Signalized	• Dedicated left turn and right turn lanes for eastbound and westbound traffic • Dedicated left turn lane for northbound and southbound traffic	No crosswalks
Highway 1A / Woodland Road	Two-Way Stop Control	• Dedicated left turn and right turn lanes for eastbound and westbound traffic • Stop control for northbound and southbound traffic	No crosswalks
Highway 1A / Lochend Road	Two-Way Stop Control	• Dedicated left turn and right turn lanes for eastbound and westbound traffic • Stop control for northbound and southbound traffic	No crosswalks
Burma Road / Bearspaw Road	Two-Way Stop Control	• Dedicated right turn lane for northbound, southbound, and westbound traffic • Stop control for eastbound and westbound traffic	No crosswalks
Burma Road / Woodland Road	Two-Way Stop Control	• Shared left / through / right lanes for all directions • Stop control for eastbound and westbound traffic	No crosswalks

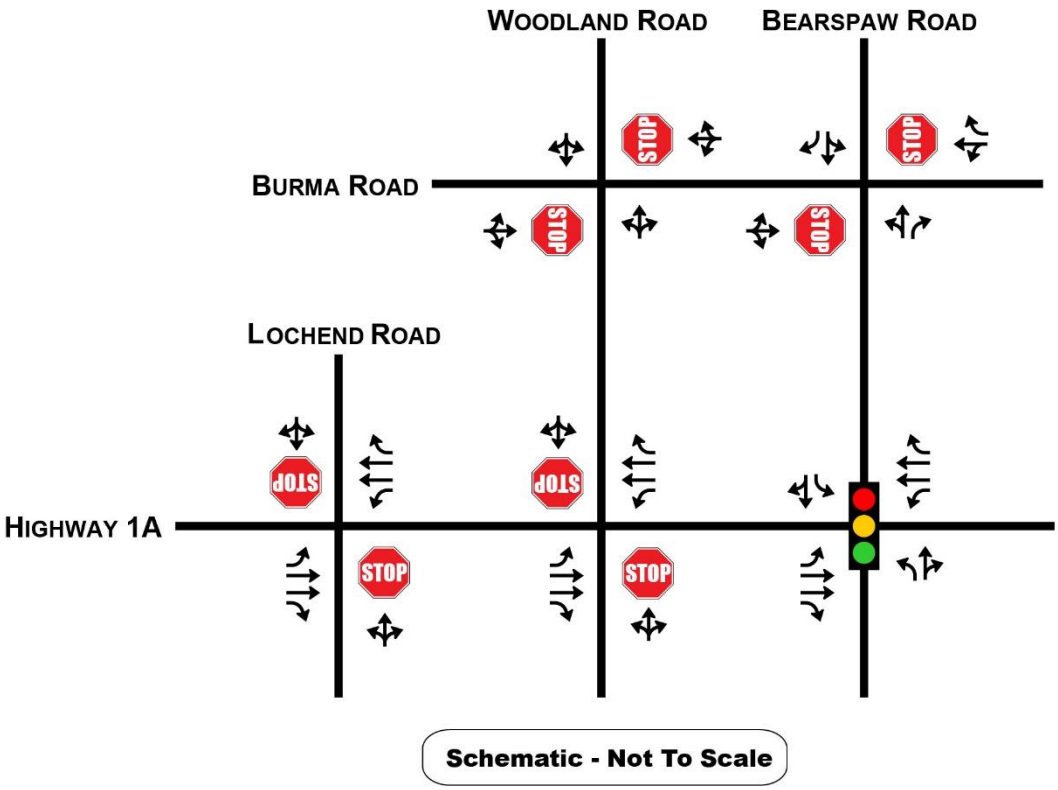


Figure 3: Existing Traffic Control

3.0 FUTURE CONDITIONS

3.1 Model Growth Assumptions

RVC's traffic-forecasting model (last updated in 2024) was used to estimate the PM peak hour traffic volumes for the 2035 and 2045 horizons. The traffic model incorporates population and employment growth projections within the County and for the Calgary Region. Assumptions related to the growth for each of these areas for each horizon year is summarized in the following sections.

For the Network Analysis, the Conceptual Schemes and TIA's for Bearspaw Country Residential, Indigo Hills, Glendale Ranch, and Glendale Road were included.

3.1.1 2035 Growth Assumptions

Rocky View County Growth

In the 2040 RVC traffic model, the assumption is that RVC is at 100% build-out. Through discussions with RVC administration, RVC background traffic volumes for the 2035 horizon was determined by calculating 75% of the 2040 RVC model volumes.

City of Calgary Growth

The published City of Calgary land use information for the future horizon years was also used as input to the traffic forecasting model. The City's forecast model divides the City into hundreds of zones referred to as "Transportation Zones". The RVC model has aggregated these zones into "super-zones" since detailed analysis within the City is not required. To determine the 2035 growth, the available City land use information for the 2028 and 2039 horizon years was interpolated.

Growth in Surrounding Areas

Although growth in Airdrie and Cochrane will have a negligible impact on traffic volumes in the Bearspaw ASP, for the City of Airdrie and the Town of Cochrane it was assumed that there was a 2.5% growth rate per year.

3.1.2 2045 Growth Assumptions

Rocky View County Growth

As mentioned above, the 2040 RVC traffic model assumes that RVC is at 100% build out. The same assumption is carried forwards for the 2045 horizon. The same land area for RVC in the 2040 model was used for the 2045 horizon.

City of Calgary Growth

As mentioned in **Section 3.1.1**, the available City of Calgary land use information was used. For determining the 2045 growth, the land use information for 2039 and 2048 horizon years was interpolated.

Growth in Surrounding Areas

The growth rates discussed in **Section 3.1.1** were also used for the 2045 horizon year.

3.2 ASP Land Use Assumptions

For traffic modeling purposes, RVC staff provided guidance on the land uses proposed within the Bearspaw ASP. The locations of the different land use types in the Bearspaw ASP are illustrated in the detailed land use map shown in **Figure 4**.

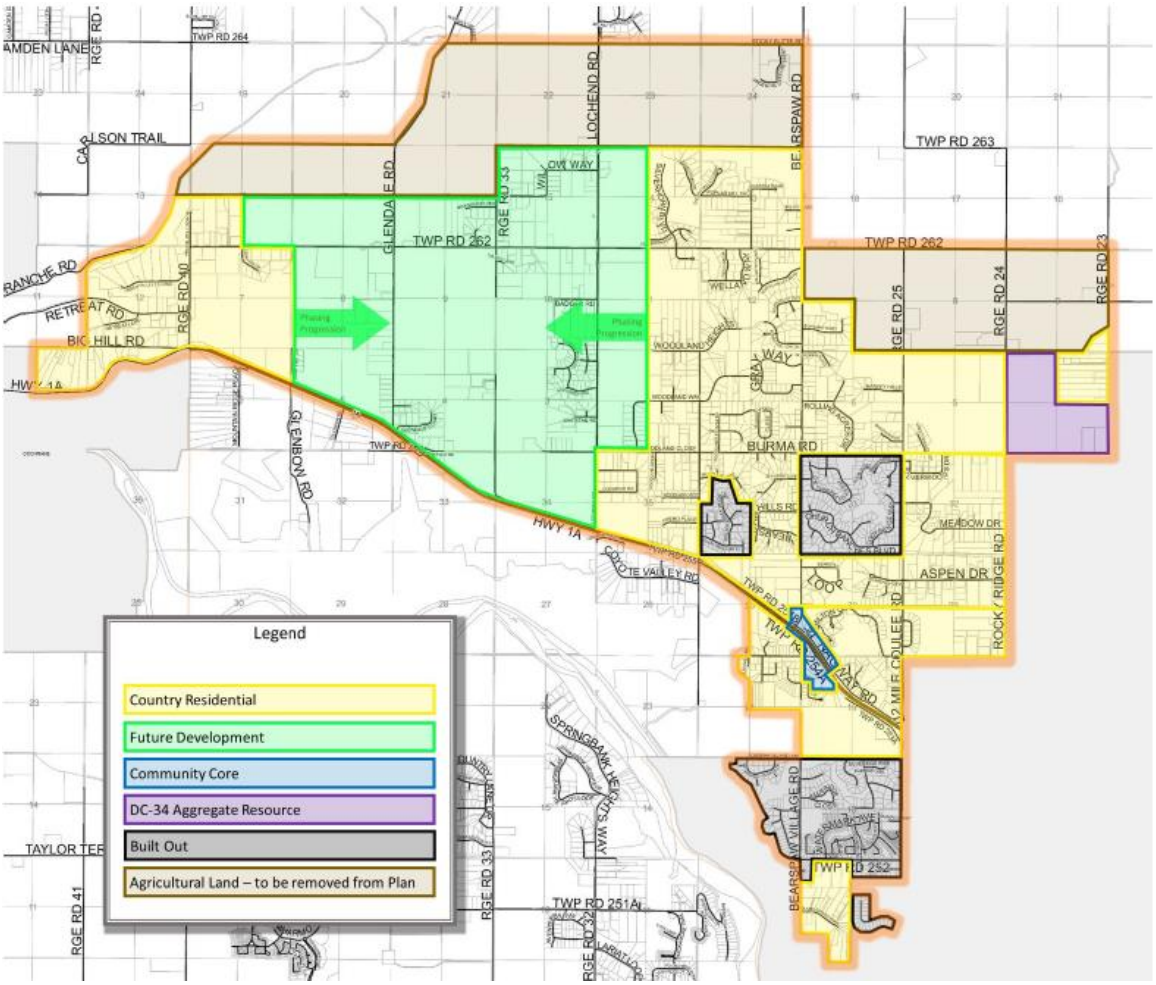


Figure 4: Proposed Land Uses

3.2.1 Future Development Area

As shown in **Figure 4**, above, there is a portion of the Bearspaw ASP designated for future development. As stated in the Bearspaw ASP, "development within the Future Development area shall not occur unless supported by an approved Local Plan."

For the purposes of the Network Analysis, no new development was included in either the 2035 or 2045 horizons within the Future Development area unless there was an existing approved Conceptual Scheme.

3.3 ASP Trip Generation and Assignment

For traffic modelling purposes, RVC staff provided guidance on the land uses proposed within the Bearspaw ASP for 2035 and 2045 horizon years. Based on the proposed land

uses, trip generation was calculated using rates published by the Institute of Transportation Engineers (ITE) for the PM peak hour, as shown below. Resulting traffic volumes are presented in **Table 2**.

- **Single Family Detached Housing | ITE 210 Trip Generation**
  - PM Peak Hour 0.94 / unit (63% inbound / 37% outbound)
- **Shopping Plaza (40-150k) – with supermarket | ITE 821 Trip Generation**
  - PM Peak Hour 9.03 / 1,000 sq. ft. (48% inbound / 52% outbound)

Table 2: Trip Generation

2035 Horizon				
Land Use	**GFA / Units**	**Trips Generated PM Peak Hour**		
		Total	**IB**	**OB**
Single Family Detached Housing	3,043	2,860	1,802	1,058
Shopping Plaza	94,500	854	410	444
	Total	**3,714**	**2,212**	**1,502**
2045 Horizon				
Land Use	**GFA / Units**	**Trips Generated PM Peak Hour**		
		Total	**IB**	**OB**
Single Family Detached Housing	4,010	3,770	2,375	1,395
Shopping Plaza	189,000	1,706	819	887
	Total	**5,476**	**3,194**	**2,282**

The traffic generated by development cells within the study area was assigned to the transportation network based on the shortest travel time and path. The routes chosen are influenced by factors such as the capacity and posted speed limit on the analyzed roadways. A summary of the trip generation calculations and a cell-by-cell assignment is included in **Appendix D**: Trip Generation and Cell-By-Cell Assignment Data.

It should be noted that the RVC model does not account for alternative modes of transportation. Although the number of trips by transit, cycling, and walking is expected to be minimal, the results are considered conservative.

4.0 TRAFFIC VOLUMES AND CAPACITY ANALYSIS

4.1 Traffic Volumes

The 2035 and 2045 horizon year PM peak traffic volumes, as derived per **Section 3.1**, are illustrated in **Figure 5** and **Figure 6**, respectively. The detailed Visum traffic model outputs are available in **Appendix A**: Traffic Model Outputs.

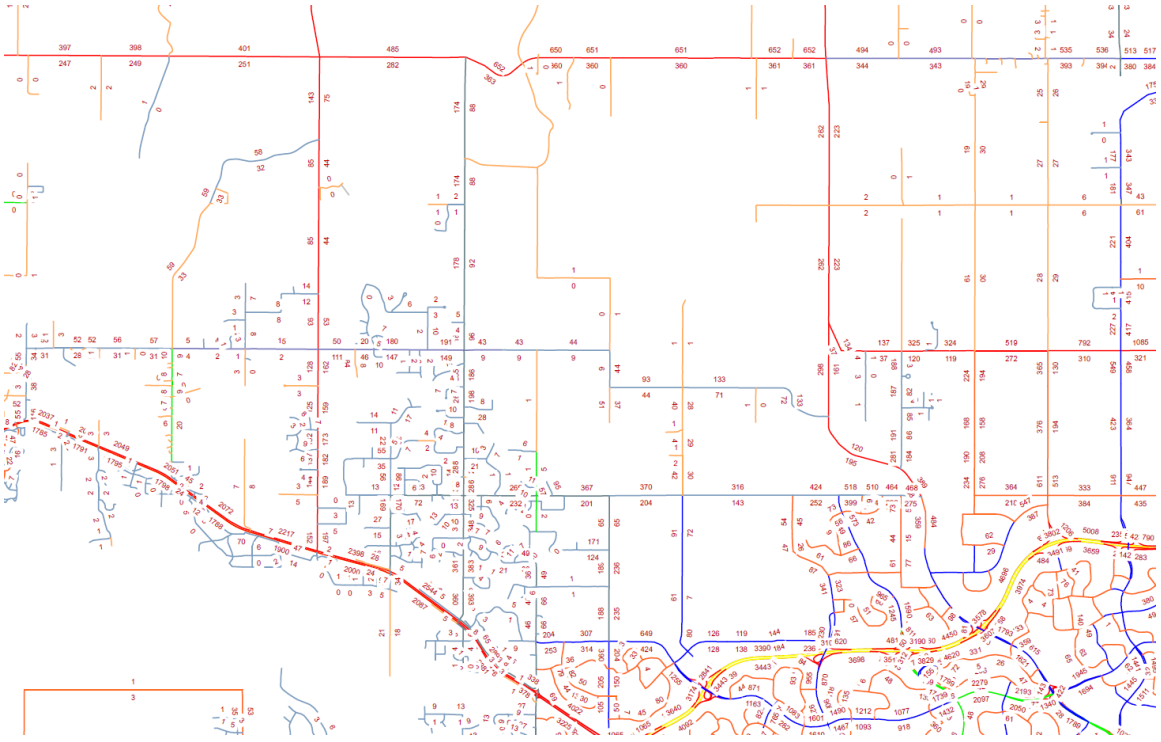


Figure 5: 2035 PM Peak Traffic Volume

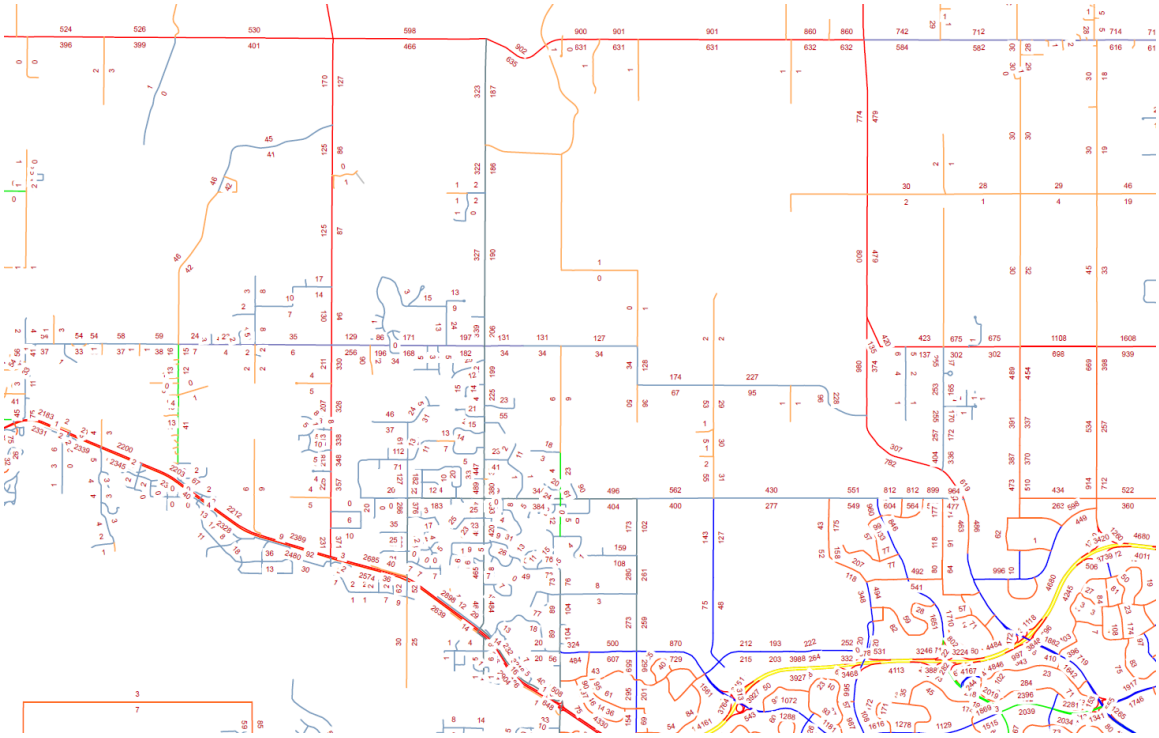


Figure 6: 2045 PM Peak Traffic Volume

4.2 Input and Calibration Parameters

Intersection operating conditions have been assessed based on the Highway Capacity Manual (HCM) methodology using the Synchro software package. Key results include the level-of-service (LOS), vehicular delay, volume-to-capacity (v/c) ratios and the 95th percentile queue lengths. Analysis parameters will conform to the TIA standards and analysis parameters outlined by RVC and ATEC, as listed in **Table 3**.

Table 3: Rocky View County and ATEC Capacity Analysis Parameters

Input Parameters	RVC	ATEC (Level 3 highways)
Ideal Saturated Flow Rate	1850 vph	-
Peak Hour Factor	1.0	-
Minimum Initial Main Street	20 seconds	-
Minimum Initial Side Street	10 seconds	-
Minimum Initial Turn Arrows	5 seconds	-

4.3 Intersection Performance Evaluation Criteria

The LOS for unsignalized (stop-controlled and roundabout) intersections is determined by the calculated delay for each critical movement. LOS 'A' represents minimal delay for minor-street traffic movements while LOS 'F' is associated with inadequate gaps for minor-street traffic. The LOS for a signalized intersection includes additional factors such as geometry, traffic and pedestrian volumes and signal phase/timing. As part of the analysis, the average delay for each lane group was calculated as well as the overall intersection delay, with operating conditions expressed as v/c ratios. **Table 4** shows the threshold criteria and **Table 5** provides an overview of associated delay per vehicle corresponding with the LOS.

Table 4: Threshold Criteria for Rocky View County and ATEC

Threshold Parameters	RVC	ATEC (Level 3 highways)
Threshold v/c Ratio	0.90	-
Minimum LOS	D	D

Table 5: Level of Service Criteria

Level Of Service (Los)	Average Delay for **Unsignalized** & **Roundabout** Intersection Movements	Average Delay for **Signalized** Intersection Movements
A	0-10 seconds per vehicle	0-10 seconds per vehicle
B	> 10-15 seconds per vehicle	>10-20 seconds per vehicle
C	>15-25 seconds per vehicle	>20-35 seconds per vehicle
D	>25-35 seconds per vehicle	>35-55 seconds per vehicle
E	>35-50 seconds per vehicle	>55-80 seconds per vehicle
F	>50 seconds per vehicle	>80 seconds per vehicle

4.4 2035 Operating Conditions

The 2035 horizon year intersection traffic volumes, as derived per **Section 3.1.1**, can be found in **Appendix A**: Traffic Model Outputs. These volumes were analyzed using the existing road network as a base. The initial results of the analysis without any network improvements are summarized in **Figure 7**, along with the estimated daily volumes. **Table 6** shows the analysis results. Complete Synchro reports can be found in **Appendix B**: Capacity Analysis Reports.

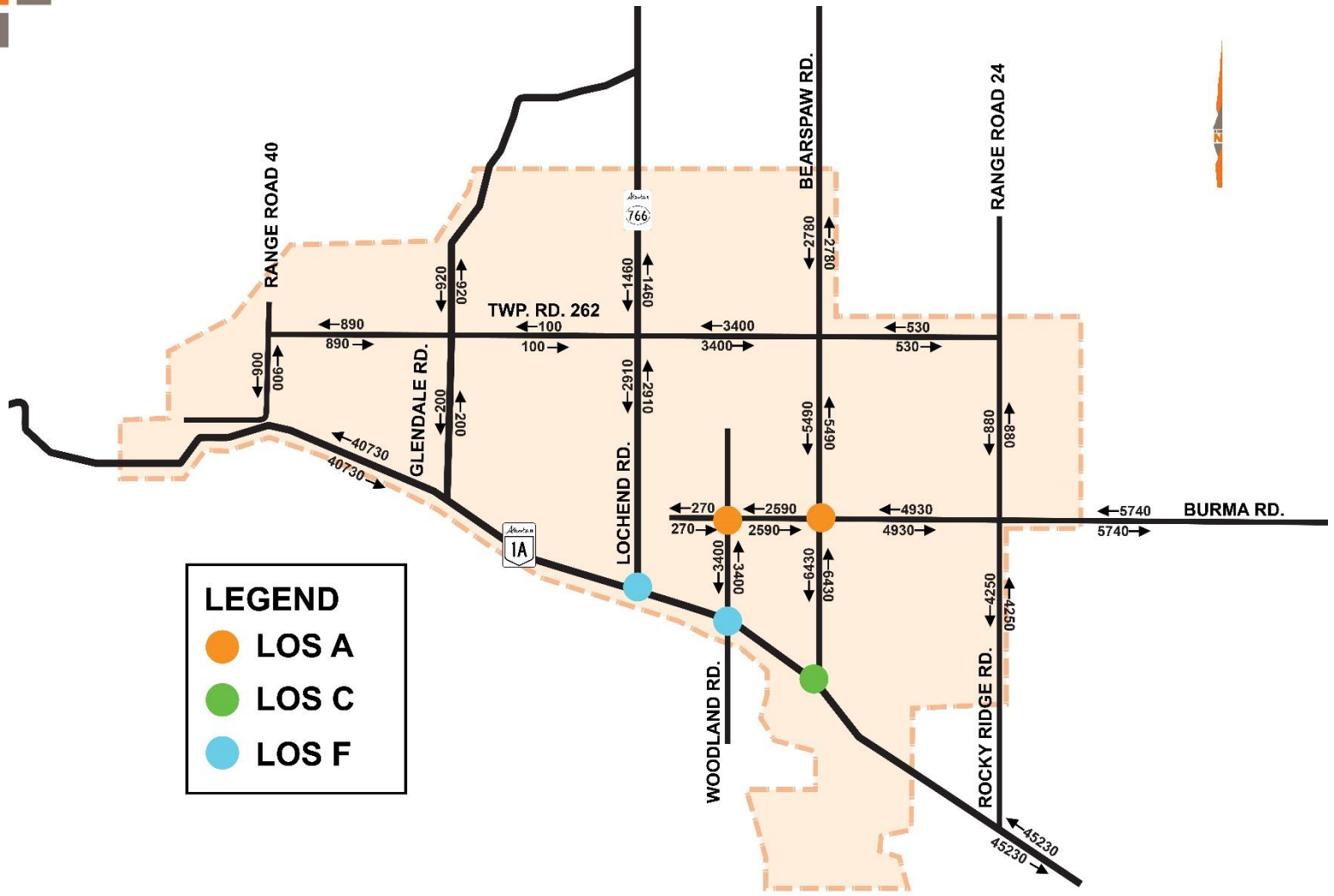


Figure 7: 2035 Daily Traffic Volumes and Capacity Analysis

Table 6: 2035 Operating Conditions

INTERSECTION / MOVEMENT			PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 1A / Bearspaw Road (Signalized)	EB	Left	0.42	C	21	6
		Through	0.77	B	14	262
		Right	0.00	A	0	0
	WB	Left	0.08	A	7	2
		Through	0.97	C	29	456
		Right	0.30	A	1	10
	NB	Left	0.05	D	50	5
		Through / Right	0.08	D	46	8
	SB	Left	1.32	F	214	147
		Through / Right	0.15	B	20	12
	Intersection Summary		-	C	32	-
Highway 1A / Woodland Road (Unsignalized)	EB	Left	0.42	E	45	14
		Through	0.57	A	0	0
		Right	0.00	A	0	0
	WB	Left	0.12	C	19	3
		Through	0.67	A	0	0
		Right	0.13	A	0	0
	NB	Left / Through / Right	ERROR	F	ERROR	ERROR
	SB	Left / Through / Right	ERROR	F	ERROR	ERROR
	Intersection Summary		-	F	ERROR	-
Highway 1A / Lochend Road (Unsignalized)	EB	Left	0.11	C	25	3
		Through	0.55	A	0	0
		Right	0.00	A	0	0
	WB	Left	0.11	C	18	3
		Through	0.65	A	0	0
		Right	0.10	A	0	0
	NB	Left / Through / Right	ERROR	F	ERROR	ERROR
	SB	Left / Through / Right	ERROR	F	ERROR	ERROR
	Intersection Summary		-	F	ERROR	-
Burma Road / Bearspaw Road (Unsignalized)	EB	Left / Through / Right	0.29	C	20	9
	WB	Left / Through	0.62	D	27	31
		Right	0.62	D	27	31
	NB	Left / Through	0.00	A	0	0
		Right	0.05	A	0	0
	SB	Left / Through	0.05	A	2	1
		Right	0.01	A	0	0
	Intersection Summary		-	A	10	-
Burma Road / Woodland Road (Unsignalized)	EB	Left / Through / Right	0.02	A	10	1
	WB	Left / Through / Right	0.18	B	11	5
	NB	Left / Through / Right	0.00	A	0	0
	SB	Left / Through / Right	0.00	A	1	0
	Intersection Summary		-	A	4	-

As shown in **Table 6**, Burma Road / Bearspaw Road and Burma Road / Woodland Road intersections are expected to operate at acceptable conditions with all movements having a LOS D or better and v/c ratios less than 0.90. For the other three intersections, the existing road network cannot support the traffic growth and therefore improvements need to be considered.

4.4.1 2035 Proposed Improvements

Table 7 summarizes the proposed improvements to for the 2035 horizon with the improvements illustrated in **Figure 8**. The analysis results, which incorporate the proposed improvements, are shown in **Table 8**. Signal warrants were completed for Highway 1A / Woodland Road and Highway 1A / Lochend Road are attached in **Appendix C**: Signal Warrants.

Table 7: 2035 Summary of Proposed Improvements

Intersection Improvements	
Highway 1A / Bearspaw Road	• Dual southbound left turn lanes • Protected phase for southbound left turn
Highway 1A / Woodland Road	• Signalization • Permitted-protected phase for eastbound and westbound left turns
Highway 1A / Lochend Road	• Signalization

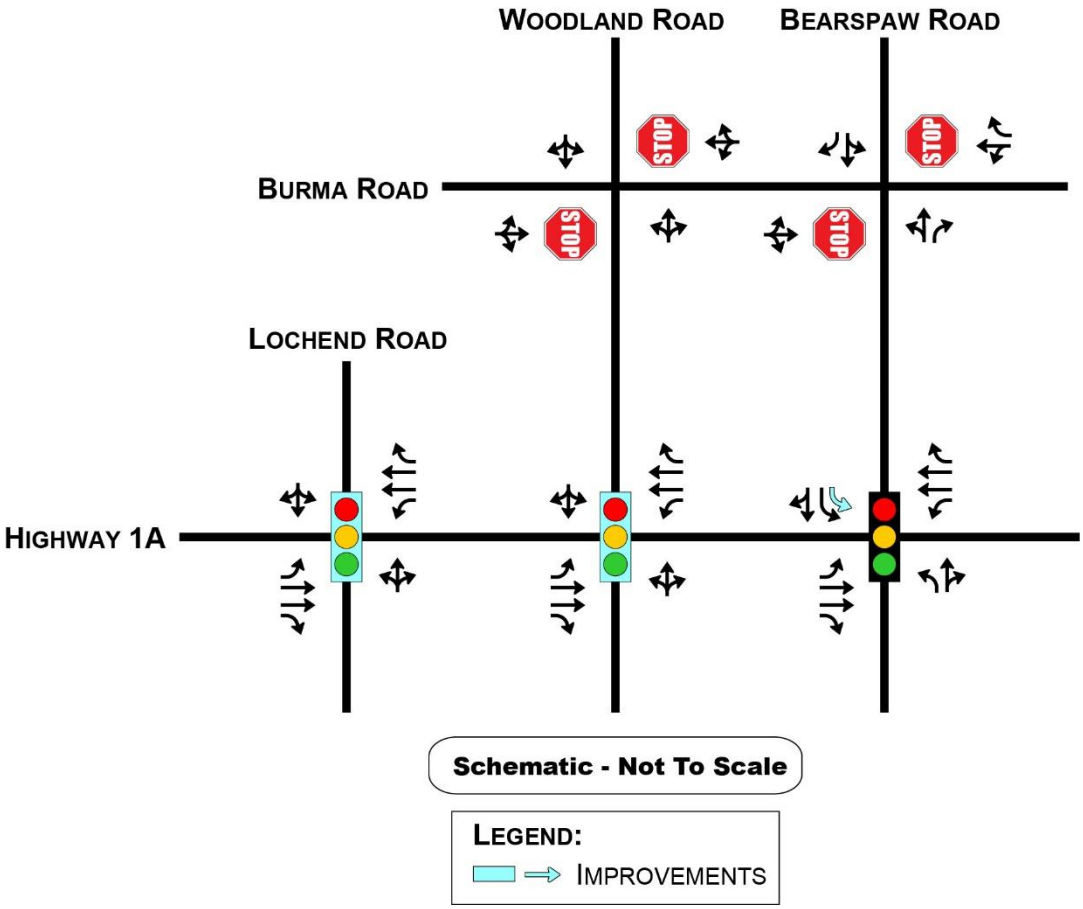


Figure 8: 2035 Improvements

Table 8: 2035 Improved Operating Conditions

INTERSECTION / MOVEMENT			PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 1A / Bearspaw Road (Signalized)	EB	Left	0.36	B	15	6
		Through	0.78	B	13	261
		Right	0.00	A	0	0
	WB	Left	0.08	A	6	2
		Through	0.98	C	31	420
		Right	0.30	A	1	10
	NB	Left	0.06	D	48	4
		Through / Right	0.19	D	50	8
	SB	Left	0.67	D	54	54
		Through / Right	0.16	B	18	11
	Intersection Summary		-	C	23	-
Highway 1A / Woodland Road (Signalized)	EB	Left	0.57	C	29	11
		Through	0.81	B	16	186
		Right	0.00	A	0	0
	WB	Left	0.33	B	12	5
		Through	0.98	C	32	295
		Right	0.19	A	2	8
	NB	Left / Through	0.13	B	16	10
	SB	Left / Through	0.81	D	54	68
	Intersection Summary		-	C	25	-
Highway 1A / Lochend Road (Signalized)	EB	Left	0.24	B	13	6
		Through	0.75	B	10	130
		Right	0.00	A	0	0
	WB	Left	0.39	C	22	16
		Through	0.88	B	16	220
		Right	0.14	A	1	5
	NB	Left / Through / Right	0.08	B	20	8
	SB	Left / Through	0.64	D	40	36
	Intersection Summary		-	B	14	-

Table 8 shows that all movements at the improved intersections are now operating at LOS D or better, which is within RVC's threshold. The westbound through movements (Highway 1A) at Bearspaw Road and Woodland Road have a v/c of 0.98, which is outside of RVC's threshold. The condition should be continued to be monitored and should considered to improve Highway 1A by widening to 3 through lanes by 2035, which will

be required by 2045 (further discussed in **Section 4.5.1**). All other movements have a v/c of less than 0.90, which is within RVC's threshold.

4.5 2045 Operating Conditions

The 2045 horizon year intersection traffic volumes, as derived per **Section 3.1.2**, can be found in **Appendix A**: Traffic Model Outputs. These volumes were analyzed using the existing road network as a base. The initial results of the analysis without any network improvements are summarized in **Figure 9**, along with the estimated daily volumes. The improvements mentioned in **Section 4.4.1** were carried forward. **Table 9** shows the analysis results. Complete Synchro reports can be found in **Appendix B**: Capacity Analysis Reports.

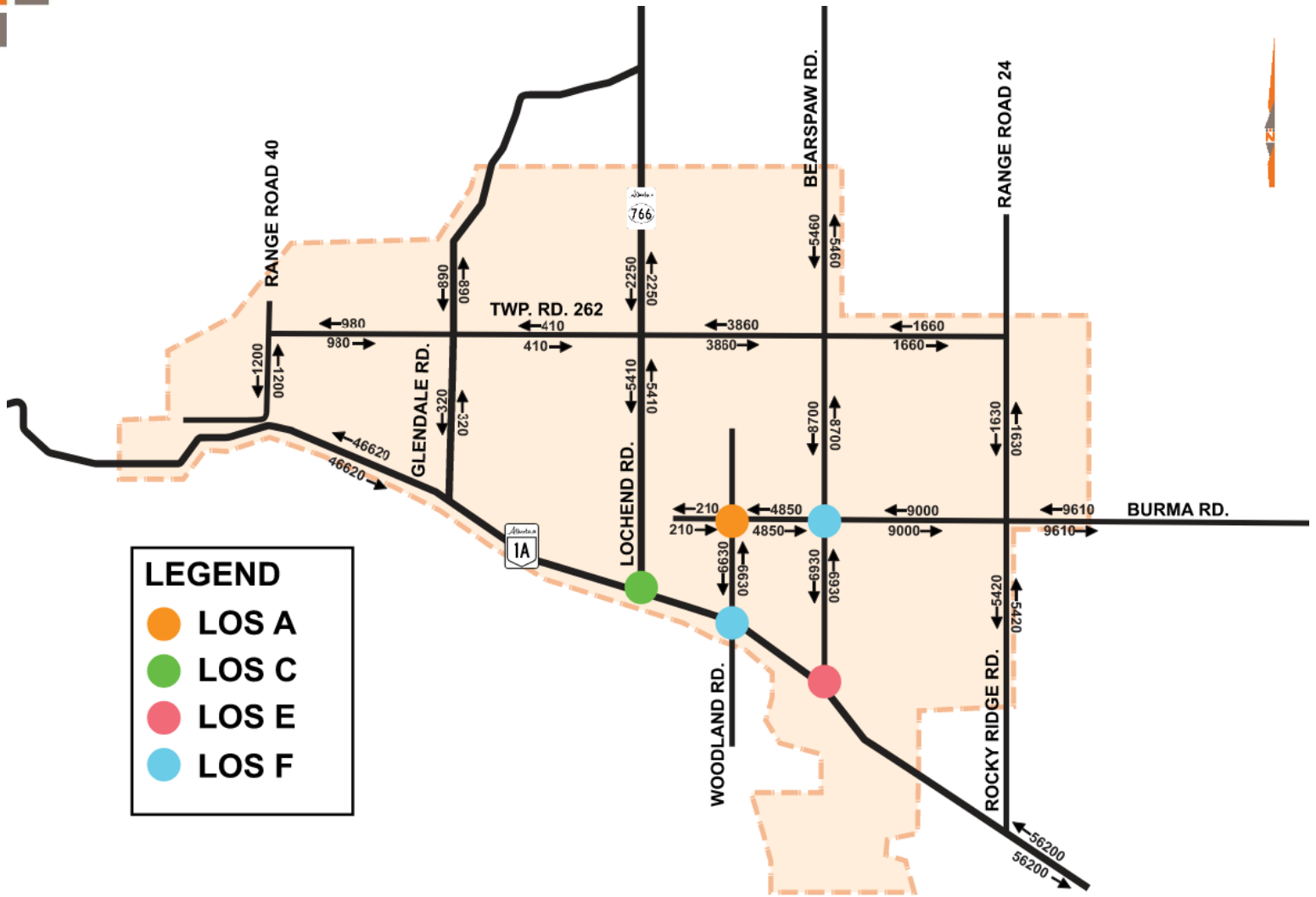


Figure 9: 2045 Daily Volumes and Capacity Analysis

Table 9: 2045 Operating Conditions

INTERSECTION / MOVEMENT			PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 1A / Bearspaw Road (Signalized)	EB	Left	1.31	F	223	60
		Through	0.98	C	34	438
		Right	0.00	A	0	0
	WB	Left	0.09	A	8	2
		Through	1.13	F	87	496
		Right	0.39	A	2	14
	NB	Left	0.05	D	43	4
		Through / Right	0.20	D	52	8
	SB	Left	0.72	E	57	63
		Through / Right	0.53	C	31	44
	Intersection Summary		-	E	59	-
Highway 1A / Woodland Road (Signalized)	EB	Left	1.69	F	363	73
		Through	1.06	E	56	315
		Right	0.00	A	0	0
	WB	Left	0.47	B	19	6
		Through	1.14	F	89	343
		Right	0.30	A	2	9
	NB	Left / Through / Right	0.15	B	16	13
	SB	Left / Through / Right	1.17	F	137	138
	Intersection Summary		-	F	81	-
Highway 1A / Lochend Road (Signalized)	EB	Left	0.59	D	41	25
		Through	1.01	D	37	259
		Right	0.00	A	0	0
	WB	Left	0.76	E	64	19
		Through	0.97	C	27	241
		Right	0.25	A	1	7
	NB	Left / Through / Right	0.13	C	23	13
	SB	Left / Through / Right	0.79	D	49	61
	Intersection Summary		-	C	32	-
Burma Road / Bearspaw Road (Unsignalized)	EB	Left / Through / Right	1.32	F	228	102
	WB	Left / Through	1.58	F	322	163
		Right	1.58	F	322	163
	NB	Left / Through	0.01	A	0	0
		Right	0.06	A	0	0
	SB	Left / Through	0.08	A	2	2
		Right	0.02	A	0	0
	Intersection Summary		-	F	112	-
Burma Road / Woodland Road (Unsignalized)	EB	Left / Through / Right	0.03	B	12	1
	WB	Left / Through / Right	0.38	C	16	14
	NB	Left / Through / Right	0.00	A	0	0
	SB	Left / Through / Right	0.01	A	1	0
	Intersection Summary		-	A	5	-

As shown in **Table 9**, Burma Road / Woodland Road intersection is operating with acceptable conditions with a LOS D or better and a v/c ratio less than 0.90. The other four intersections have failing operating conditions and improvements need to be considered.

4.5.1 2045 Improvements

Table 10 summarizes the proposed improvements for the 2045 horizon with the improvements illustrated in **Figure 10**. The analysis results, which incorporate the proposed improvements, are shown in **Table 11**. A signal warrant was completed for Burma Road / Bearspaw Road and is attached in **Appendix C**: Signal Warrants.

Table 10: 2045 Summary of Improvements

Intersection Improvements	
Highway 1A / Bearspaw Road	• Three eastbound and westbound through lanes • Protected phase for eastbound and westbound left turn
Highway 1A / Woodland Road	• Three eastbound and westbound through lanes • Protected phase for eastbound and westbound left turn • Dedicated southbound left turn lane • Permitted-protected phase for southbound left turn
Highway 1A / Lochend Road	• Three eastbound and westbound through lanes • Protected phase for eastbound and westbound left turn
Burma Road / Bearspaw Road	• Signalization

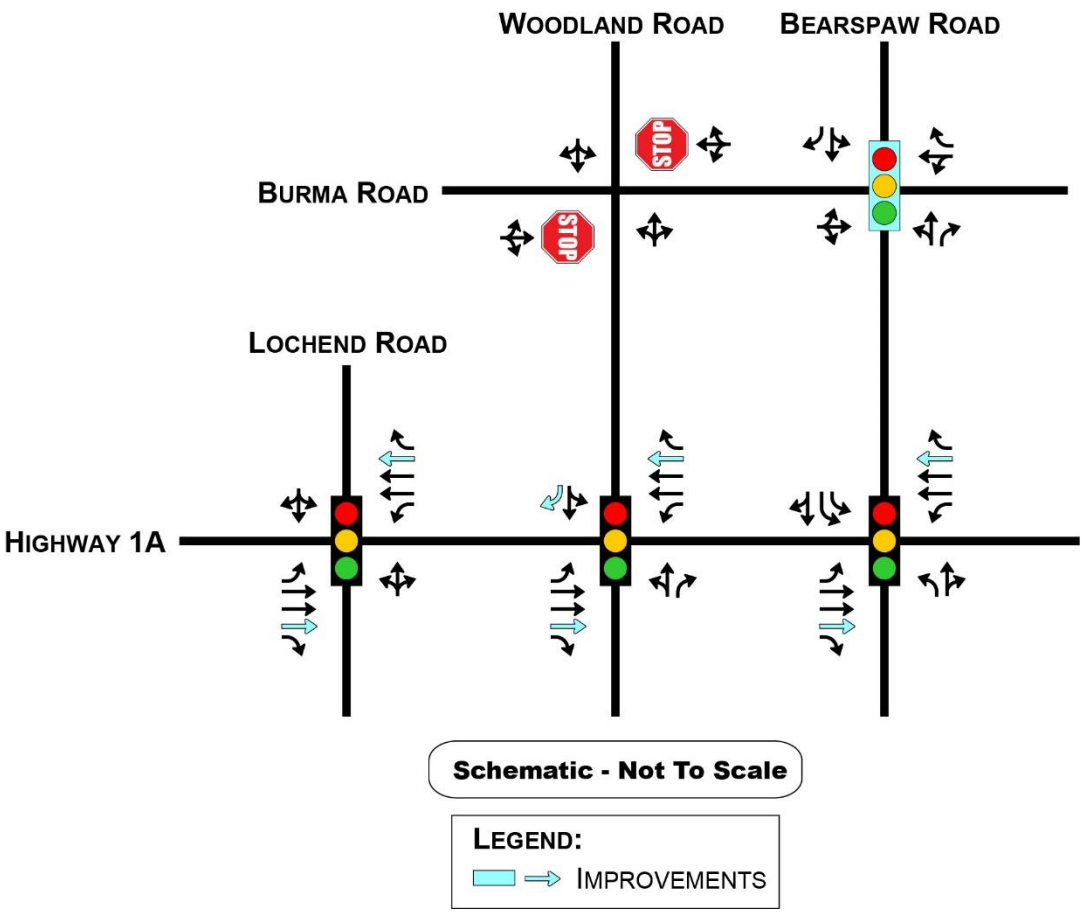


Figure 10: 2045 Improvements

Table 11: 2045 Improved Operating Conditions

INTERSECTION / MOVEMENT			PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 1A / Bearspaw Road (Signalized)	EB	Left	0.57	D	55	43
		Through	0.69	B	10	174
		Right	0.00	A	0	0
	WB	Left	0.08	D	51	7
		Through	0.93	C	27	275
		Right	0.43	A	3	15
	NB	Left	0.05	D	44	4
		Through / Right	0.20	D	47	7
	SB	Left	0.75	D	54	64
		Through / Right	0.46	B	12	21
	Intersection Summary		-	C	20	-
Highway 1A / Woodland Road (Signalized)	EB	Left	0.70	D	54	55
		Through	0.78	B	18	150
		Right	0.00	A	0	0
	WB	Left	0.37	D	51	21
		Through	0.97	D	36	223
		Right	0.34	A	3	13
	NB	Left / Through / Right	0.58	D	44	20
	SB	Left	0.74	D	53	65
		Through / Right	0.39	A	9	18
	Intersection Summary		-	C	27	-
Highway 1A / Lochend Road (Signalized)	EB	Left	0.46	D	50	21
		Through	0.84	B	19	141
		Right	0.01	A	0	0
	WB	Left	0.54	D	53	27
		Through	0.77	B	15	127
		Right	0.28	A	2	10
	NB	Left / Through / Right	0.13	B	19	12
	SB	Left / Through / Right	0.76	D	43	57
	Intersection Summary		-	B	18	-
Burma Road / Bearspaw Road (Signalized)	EB	Left / Through / Right	0.43	B	13	29
	WB	Left / Through	0.51	B	15	34
		Right	0.12	A	4	6
	NB	Left / Through	0.30	A	8	29
		Right	0.11	A	3	6
	SB	Left / Through	0.52	B	11	53
		Right	0.03	A	3	3
	Intersection Summary		-	B	11	-

Table 11 shows that all intersections are now operating with acceptable conditions according to RVC thresholds. All movements at Highway 1A / Lochend Road and Burma Road / Bearspaw Road have a LOS D or better and a v/c ratio less than 0.90. For the other two intersections, all movements have a LOS D or better, however the westbound through movements (Highway 1A) have a v/c of 0.93 and 0.97 at Bearspaw Road and Woodland Road respectively. While these are outside of RVC's threshold, there are no significant operational issues expected. The traffic operations should be continued to be monitored to assess the need for further improvements.

5.0 FUTURE TRANSPORTATION NETWORK

5.1 Proposed Cross-Sections

Based on development patterns in RVC, it is likely that the road network that will ultimately support the Bearspaw ASP will consist of rural cross-sections with overland drainage systems to manage the stormwater runoff. RVC's 2024 Draft Servicing Standards was used to determine the proposed cross-sections for the local, collector, and arterial roads.

Highway 1A is under ATEC's control and future improvements to the highway will align with the provincial Highway Geometric Design Guide (HGDG) at the time of improvements. The current rural multi-lane highway staging is illustrated in **Figure 11**.

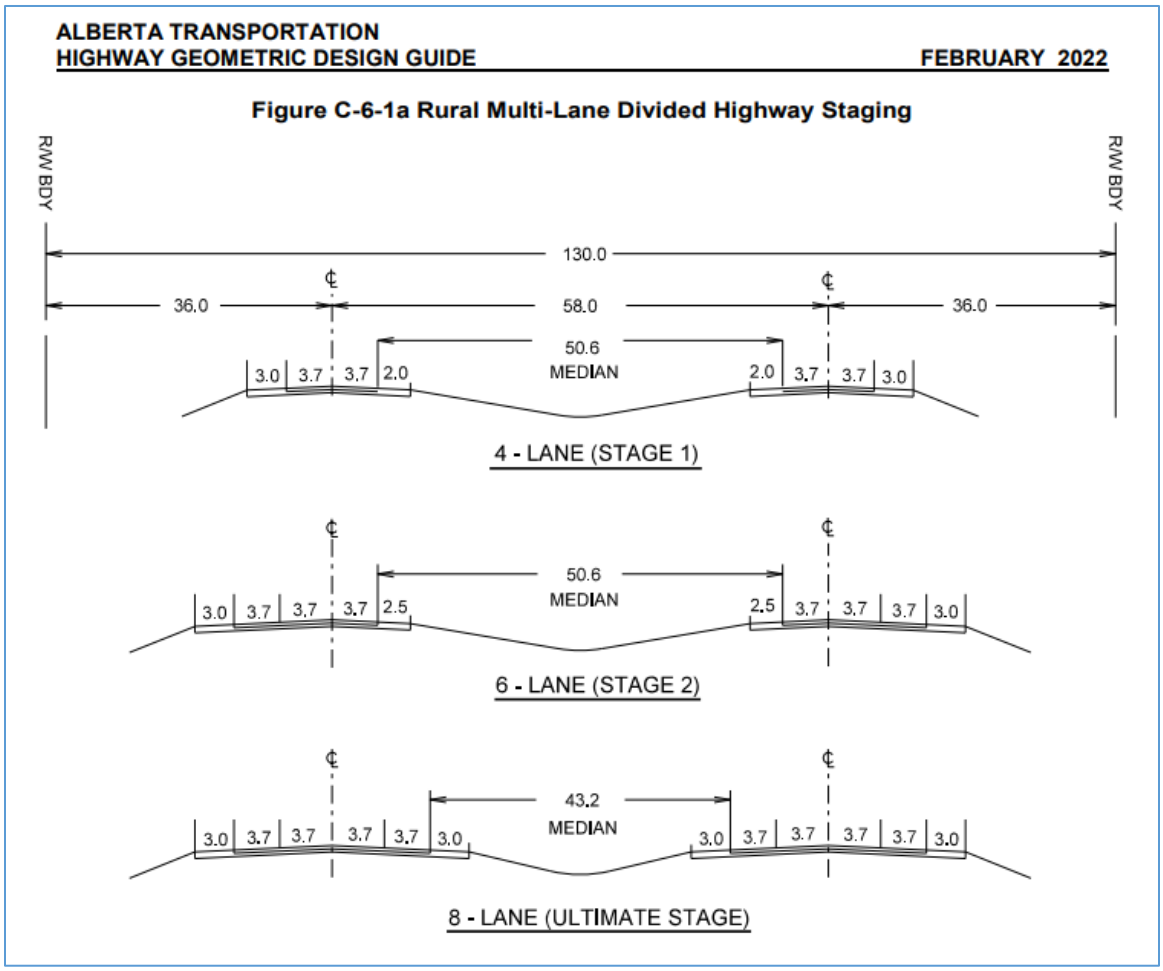


Figure 11: HGDG Figure C-6-1a Rural Multi-Lane Highway Staging

5.2 Long-Term Roadway Network

The recommended long-term road network for the Bearspaw ASP, including the number of lanes and right-of-way, is displayed in **Figure 12**. The Visum model outputs showing the Average Annual Daily Traffic (AADT) volumes can be found in **Appendix A**: Traffic Model Outputs.

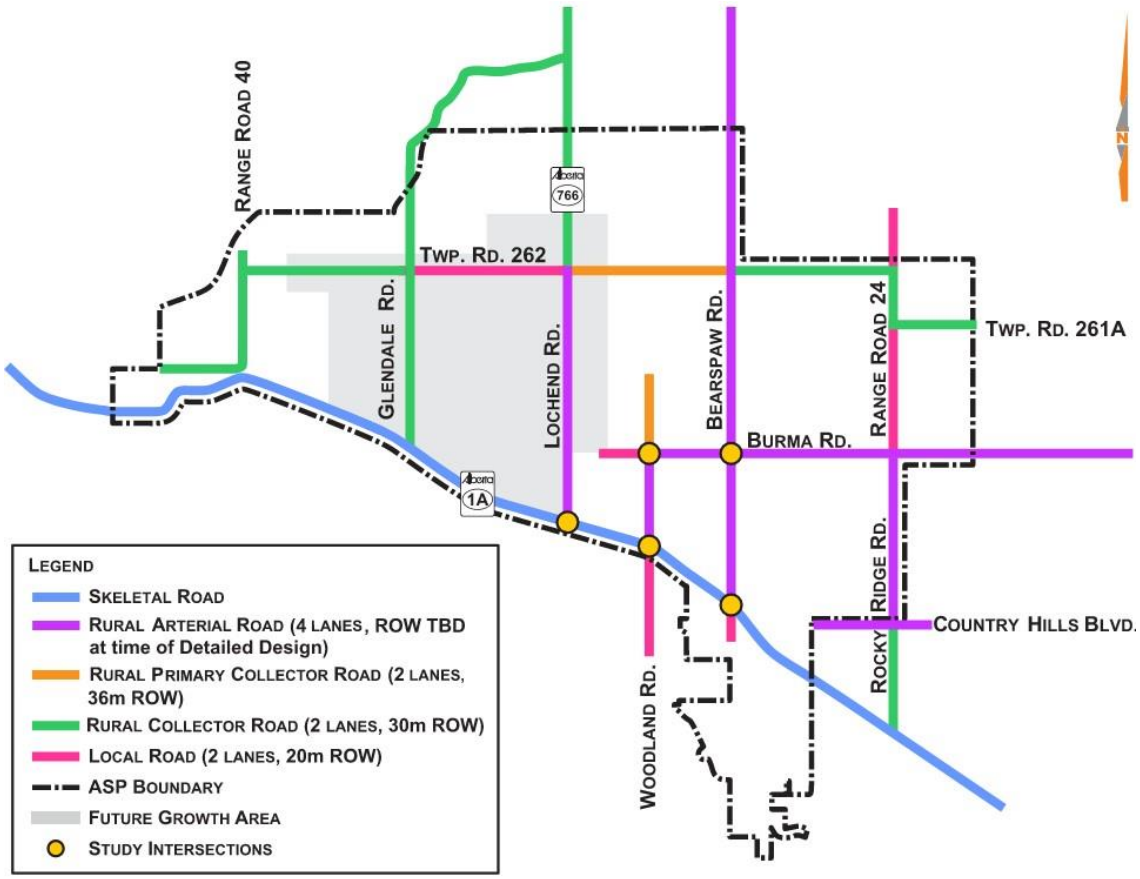


Figure 12: Future Road Network

It is noted that although the traffic volumes along Burma Road between Bearspaw Road and Woodland Road do not warrant an arterial designation, it was classified as such in anticipation of future development. This road could likely be staged as a two-lane roadway as development proceeds, but should be protected for an arterial road to accommodate future growth.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis presented in this report lead to the following key conclusions / recommendations:

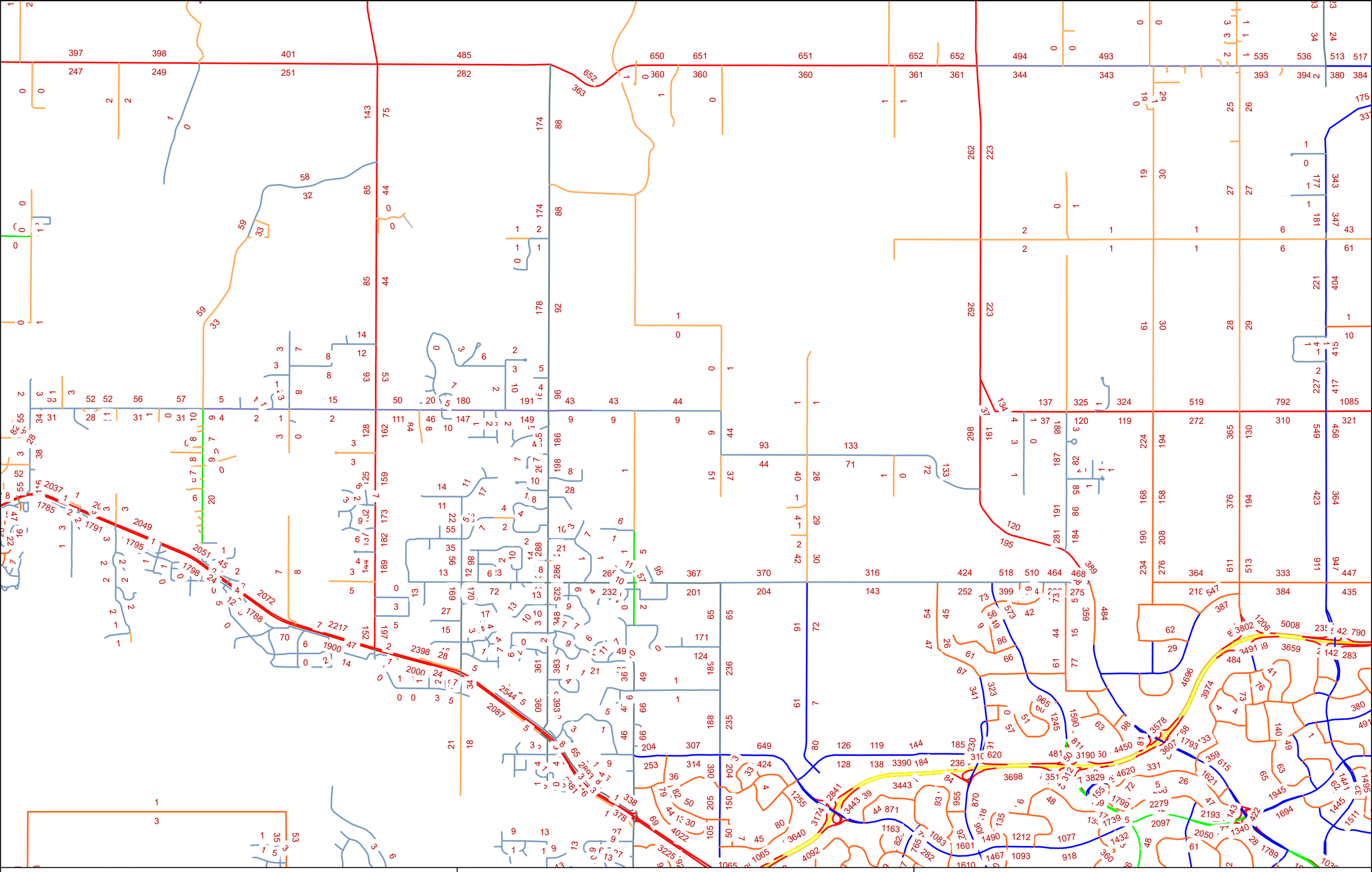
Analysis Results & Recommended Improvements

- 2035 Horizon
    - The analysis shows that Burma Road / Bearspaw Road and Burma Road / Woodland Road are operating with acceptable conditions while the other three intersections need improvements.
    - The improvements required are summarized in **Table 7** in **Section 4.4.1** and listed below:
        - Highway 1A / Bearspaw Road: dual southbound left turn and protected phase for southbound left turn;
        - Highway 1A / Woodland Road: signalized and permitted – protected phase for eastbound and westbound left turn; and
        - Highway 1A / Lochend Road: signalized.
- 2045 Horizon
    - The improvements suggested for the 2035 horizon year were carried forward.
    - The analysis shows that Burma Road / Woodland Road is operating at acceptable conditions while the other four intersections need additional improvements at this horizon year.
    - The improvements required are summarized in **Figure 10** in **Section 4.5.1** and listed below:
        - Highway 1A / Bearspaw Road: Three eastbound and westbound through lanes and protected phase for eastbound and westbound left turn;
        - Highway 1A / Woodland Road: Three eastbound and westbound through lanes, protected phase for eastbound and westbound left turn, dedicated southbound left turn lane, and permitted – protected phase for southbound left turn;
        - Highway 1A / Lochend Road: Three eastbound and westbound through lanes and protected phase for eastbound and westbound left turn; and
        - Burma Road / Bearspaw Road: signalized.

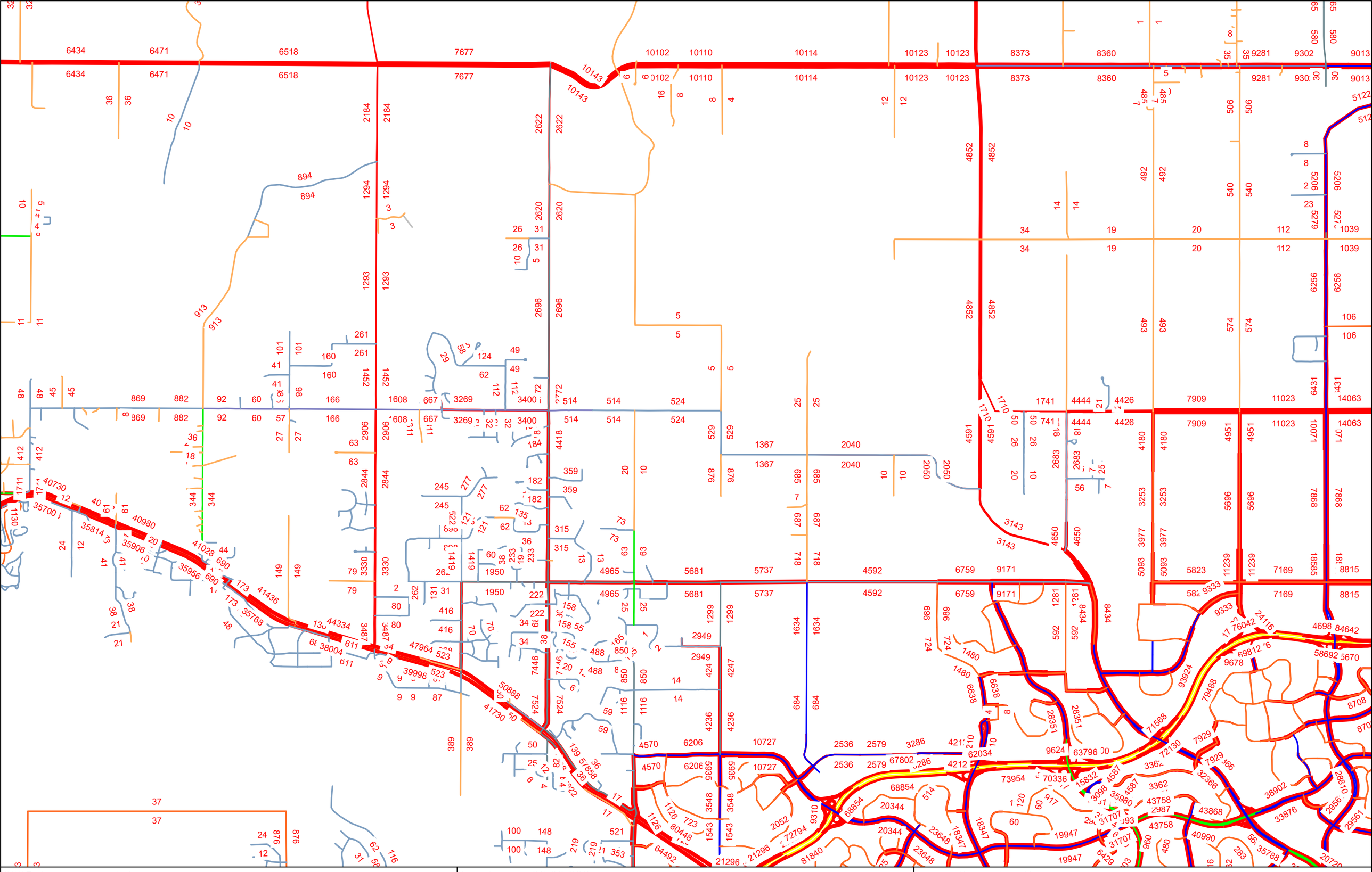
General Conclusions

- RVC should protect right of way for the network as identified in this report to provide for the future long-term road network. The network improvements should be staged as development proceeds in the area and should be subject to future transportation impact assessments.
- The future road network should be reviewed, and the analysis updated periodically as development proceeds in the area.
- Monitoring of traffic operations at the key intersections should be undertaken to provide up-to-date capacity analysis information and to ensure the transportation network is operating efficiently.

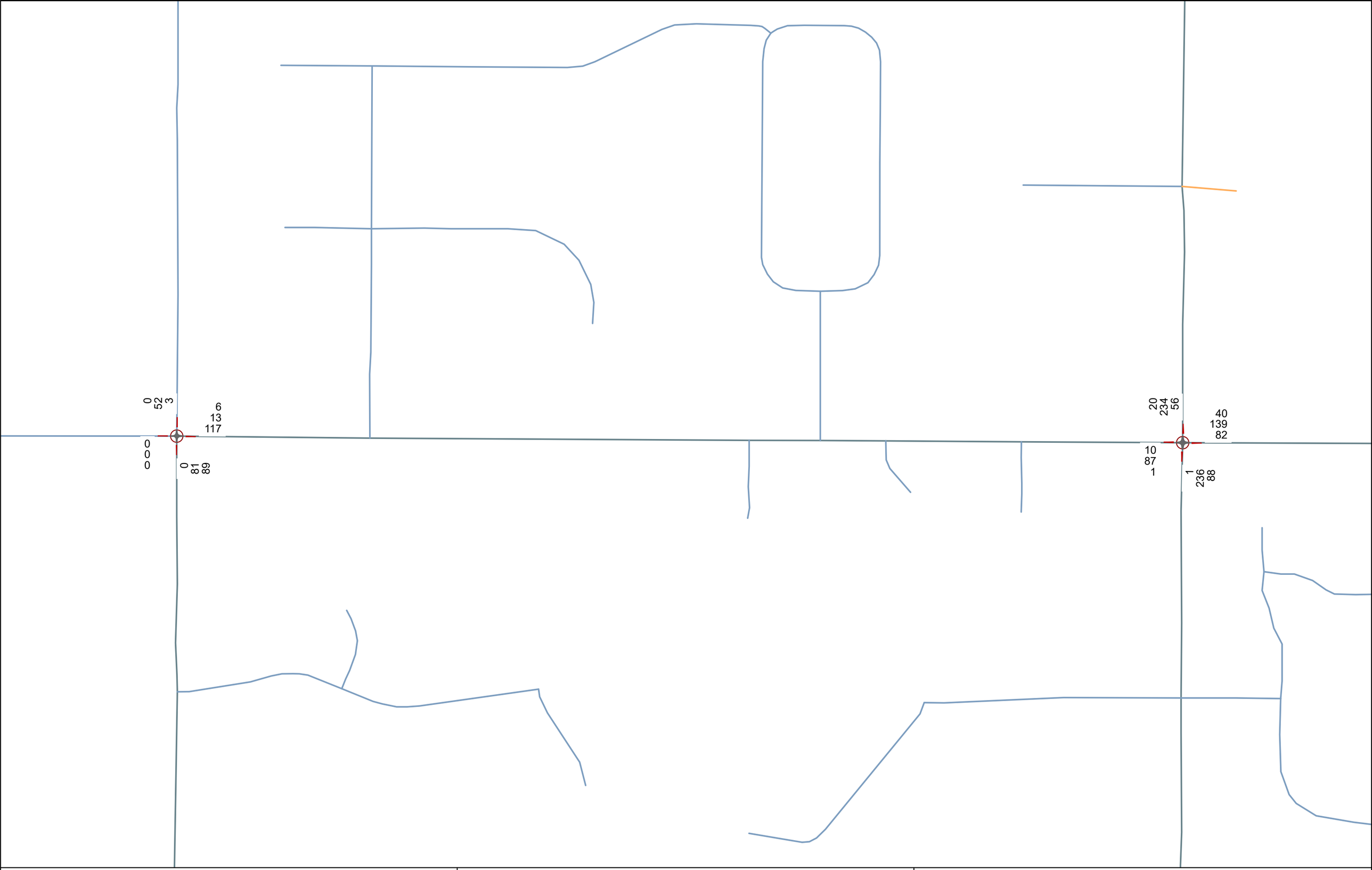
APPENDIX A: TRAFFIC MODEL OUTPUTS



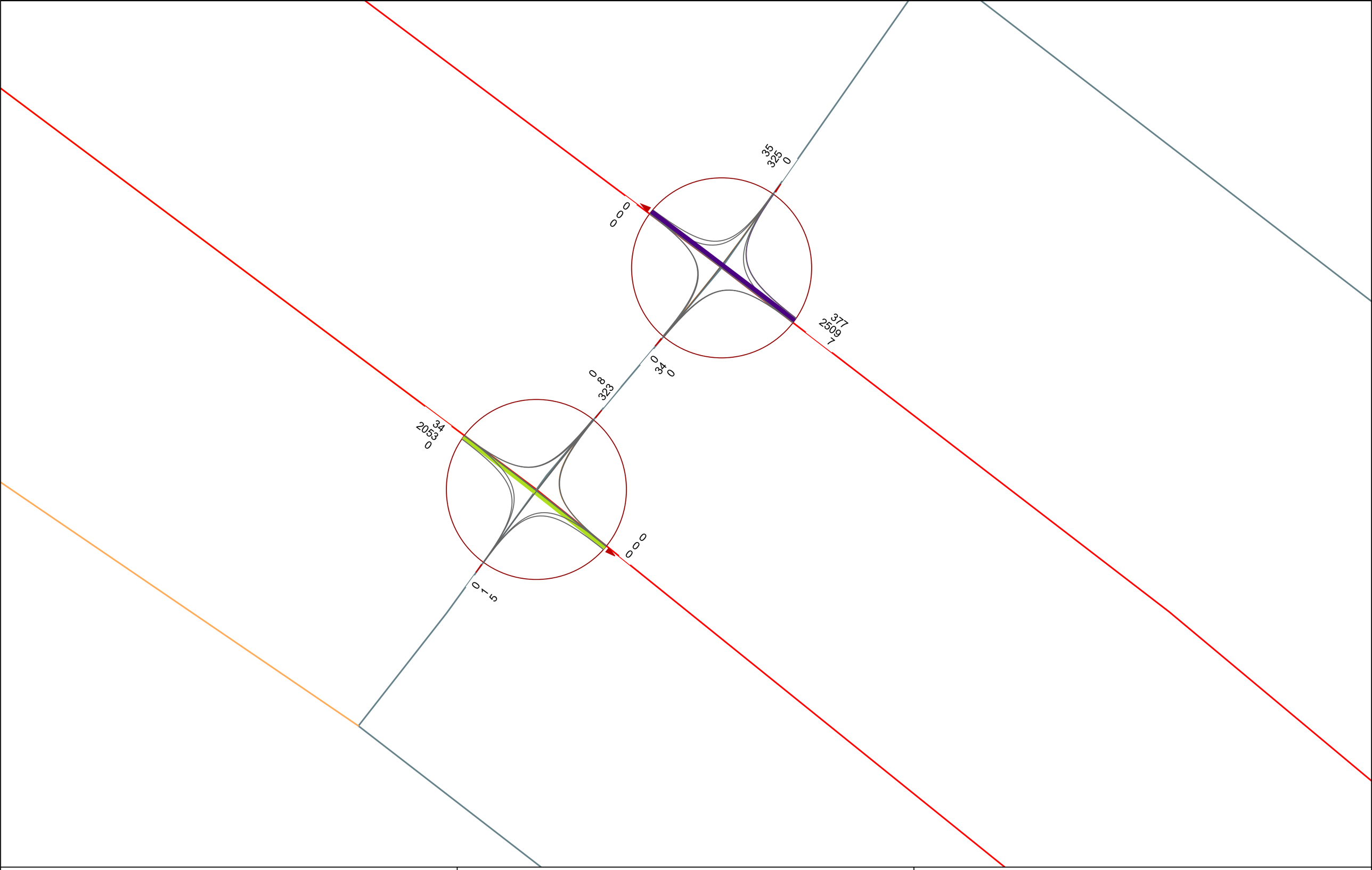
2035 Bearspaw - PM Peak Volumes	Created on: 22.08.2024	WATT Consulting Group



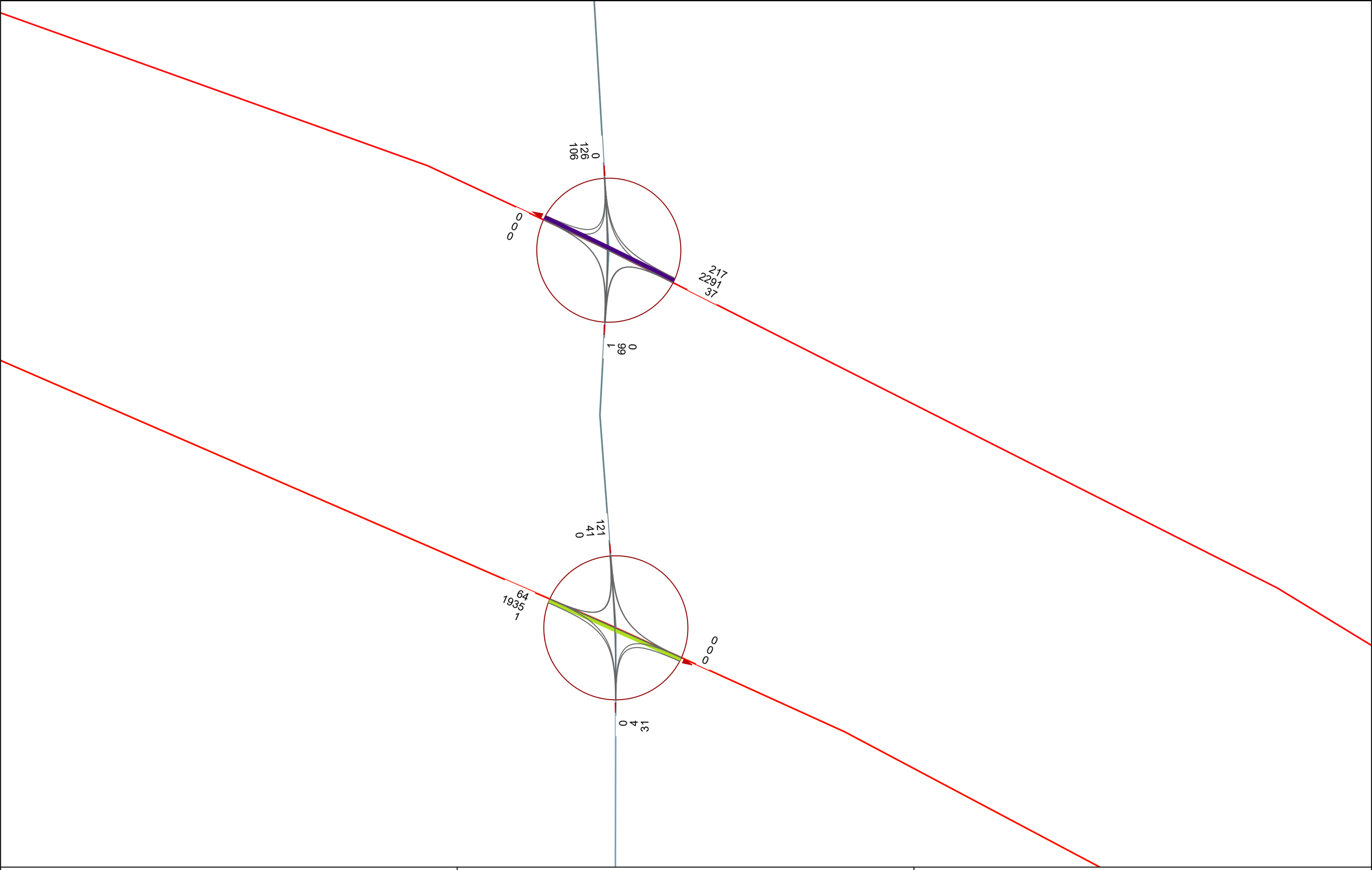
2035 Bearspaw - AADT | Created on: 22.08.2024 | WATT Consulting Group



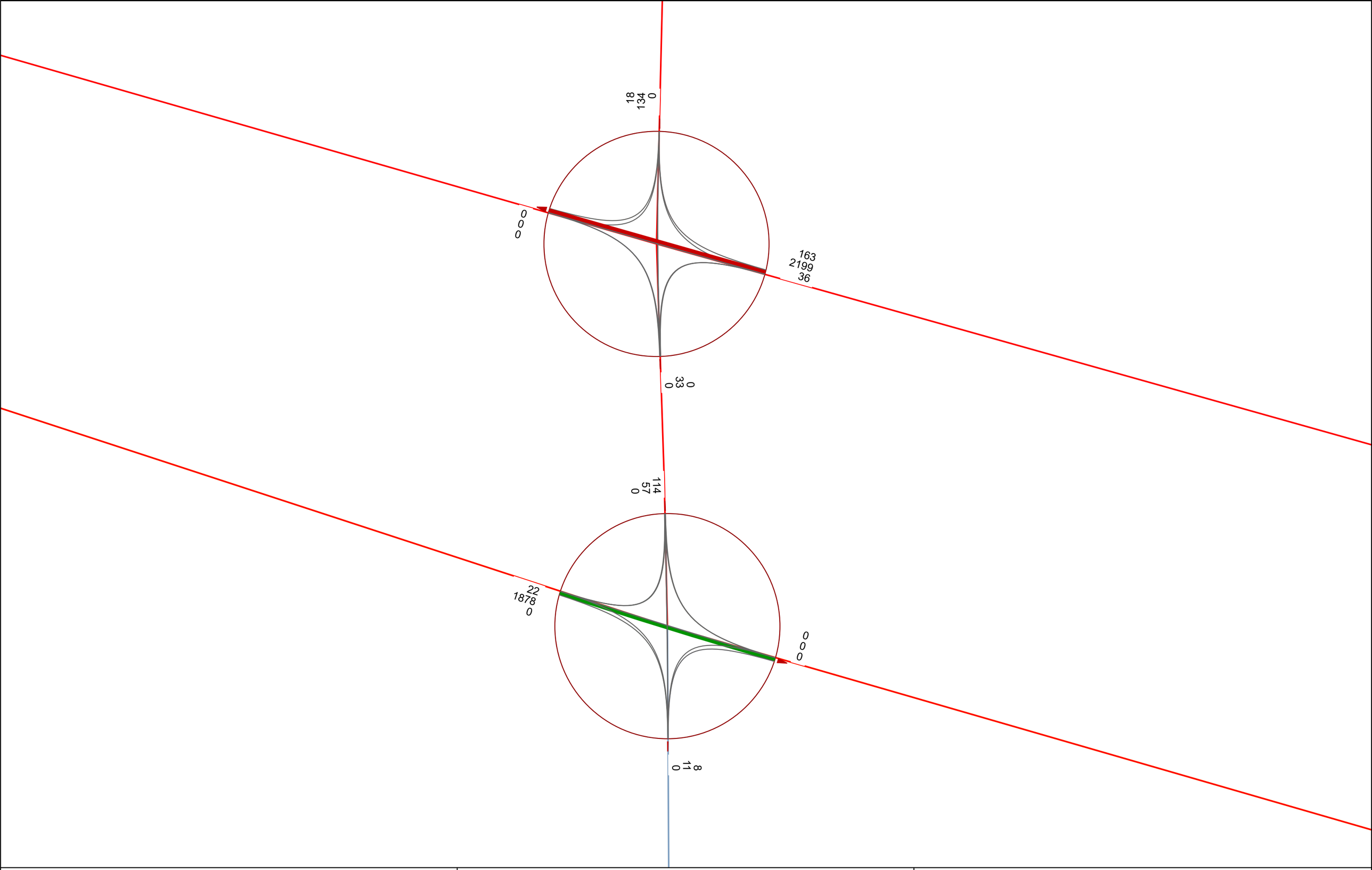
2035 Bearspaw - Burma Rd / Bearspaw Rd / Woodland Rd	Created on: 22.08.2024	WATT Consulting Group



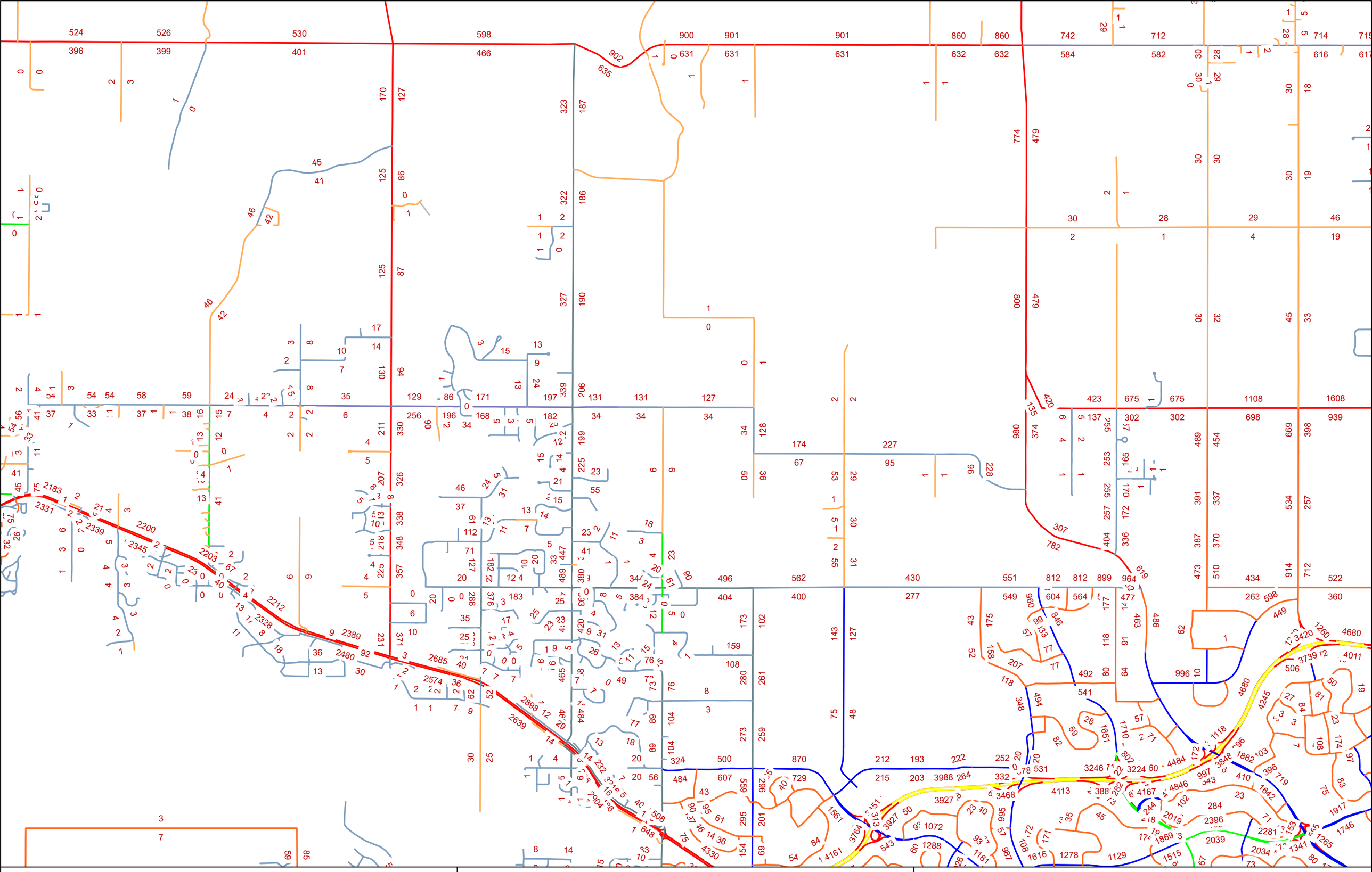
2035 Bearspaw - Hwy 1A / Bearspaw Rd	Created on: 22.08.2024	WATT Consulting Group



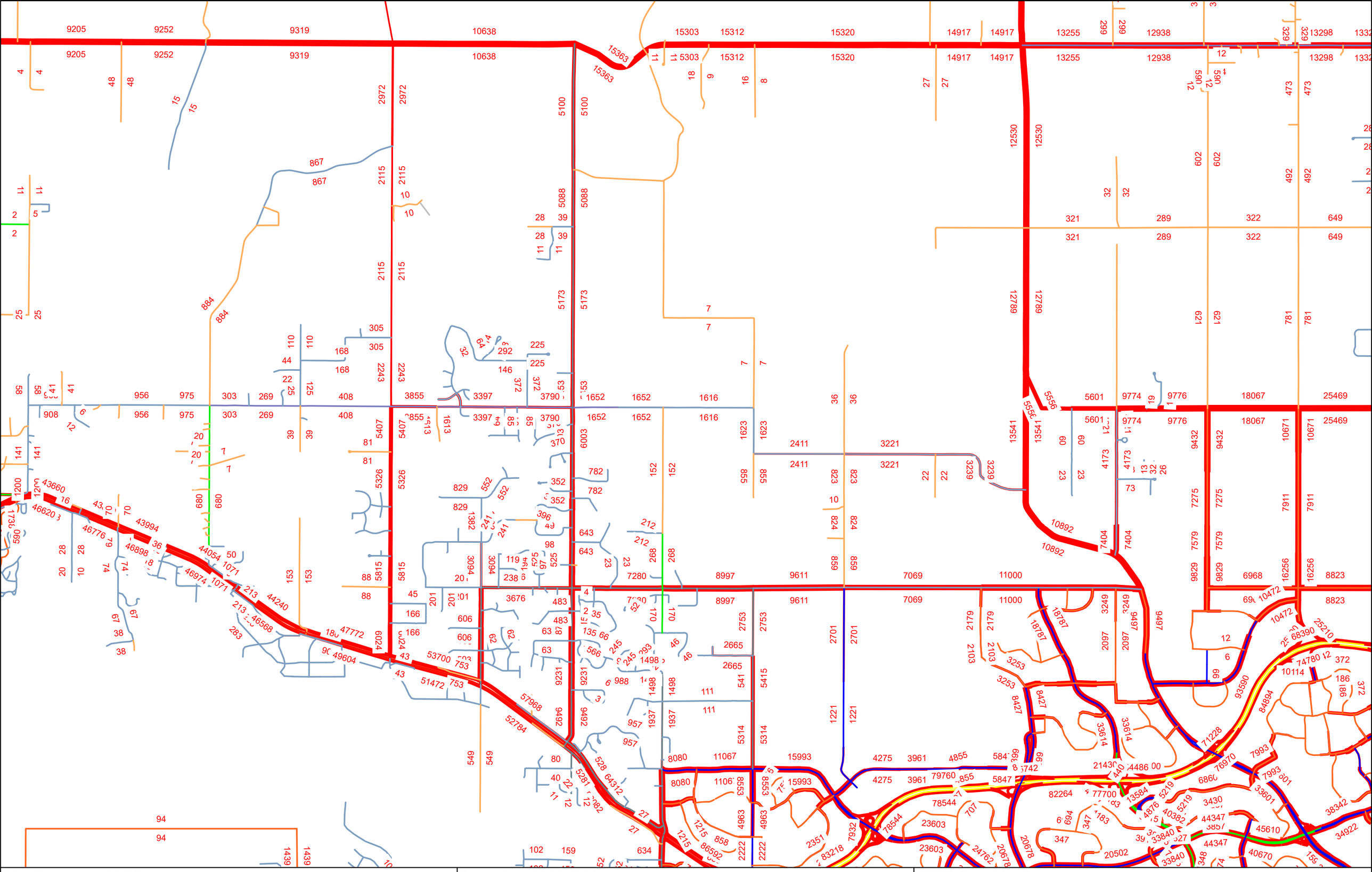
2035 Bearspaw - Hwy 1A / Woodland Rd	Created on: 22.08.2024	WATT Consulting Group



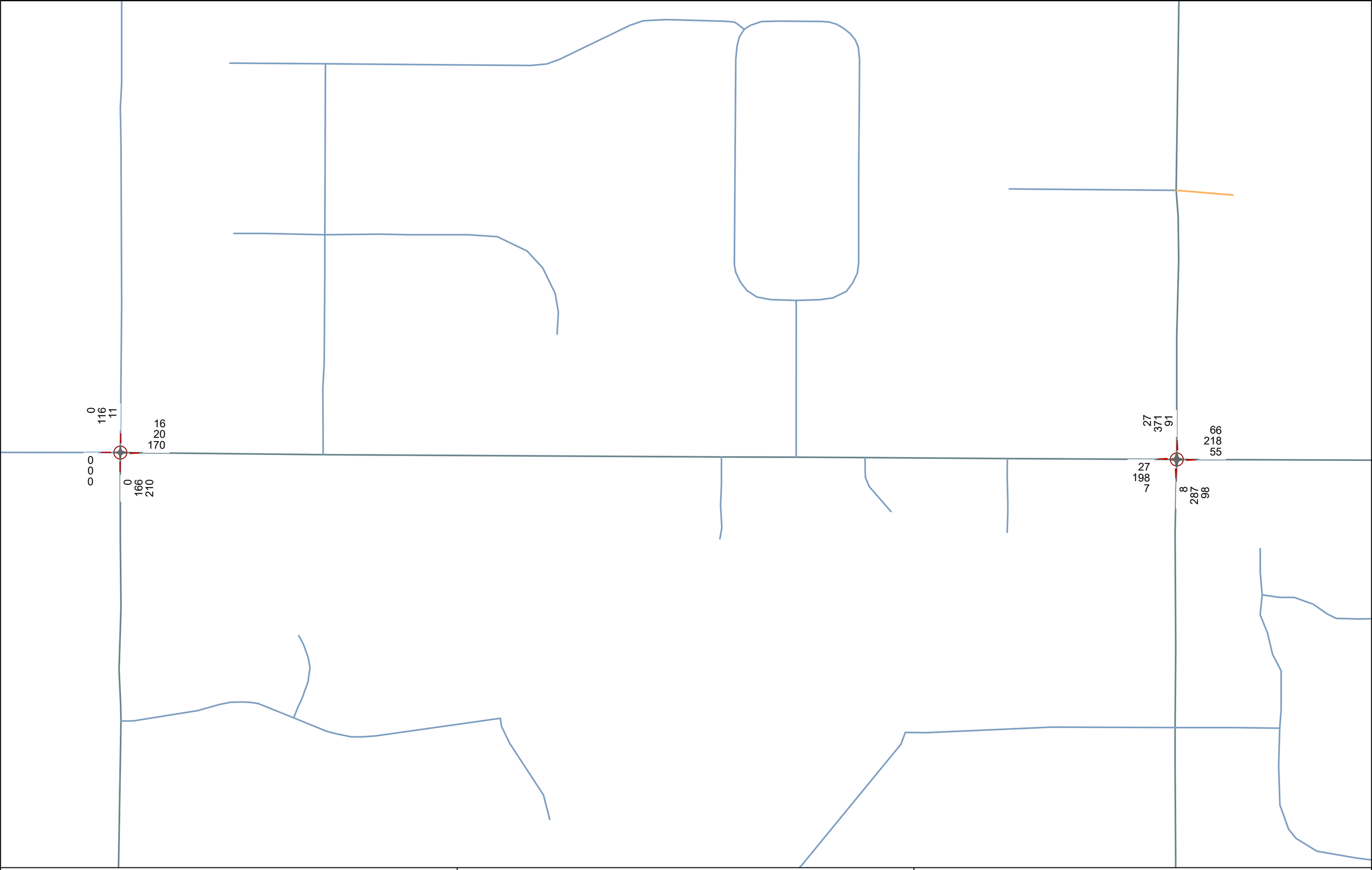
2035 Bearspaw - Hwy 1A / Lochend Rd	Created on: 22.08.2024	WATT Consulting Group



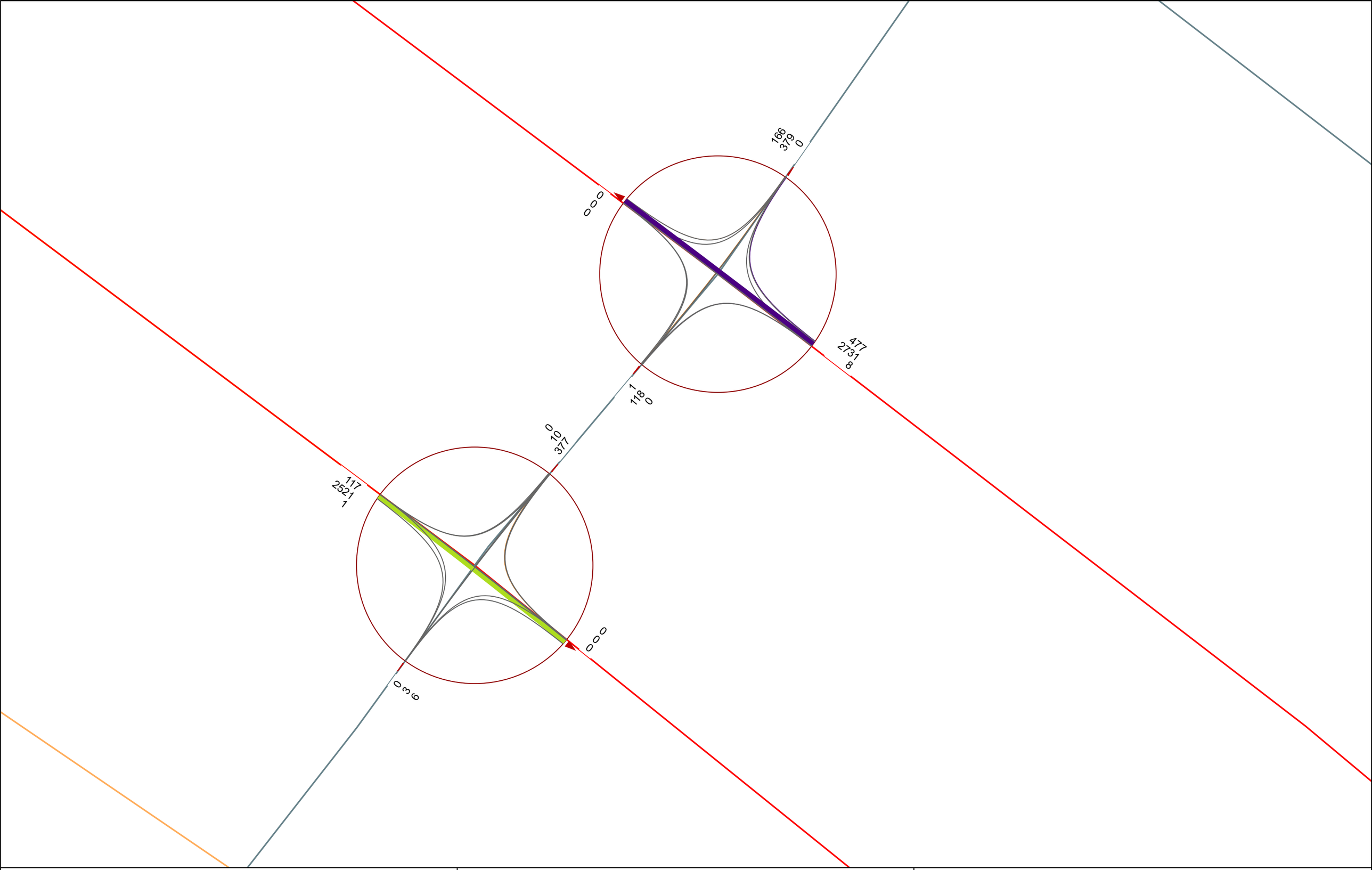
2045 Bearspaw - PM Peak Volumes | Created on: 22.08.2024 | WATT Consulting Group



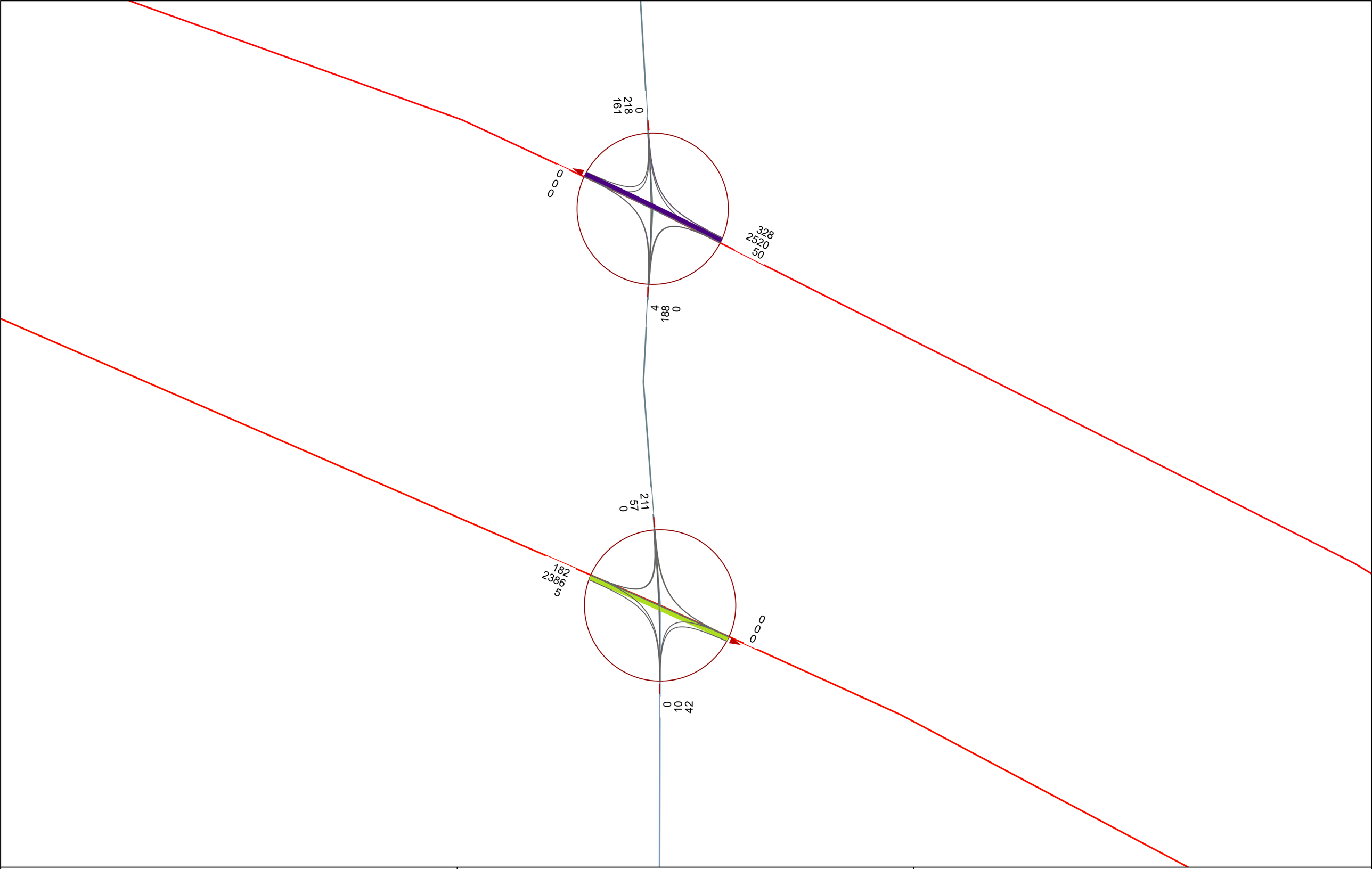
2045 Bearspaw - AADT	Created on: 22.08.2024	WATT Consulting Group



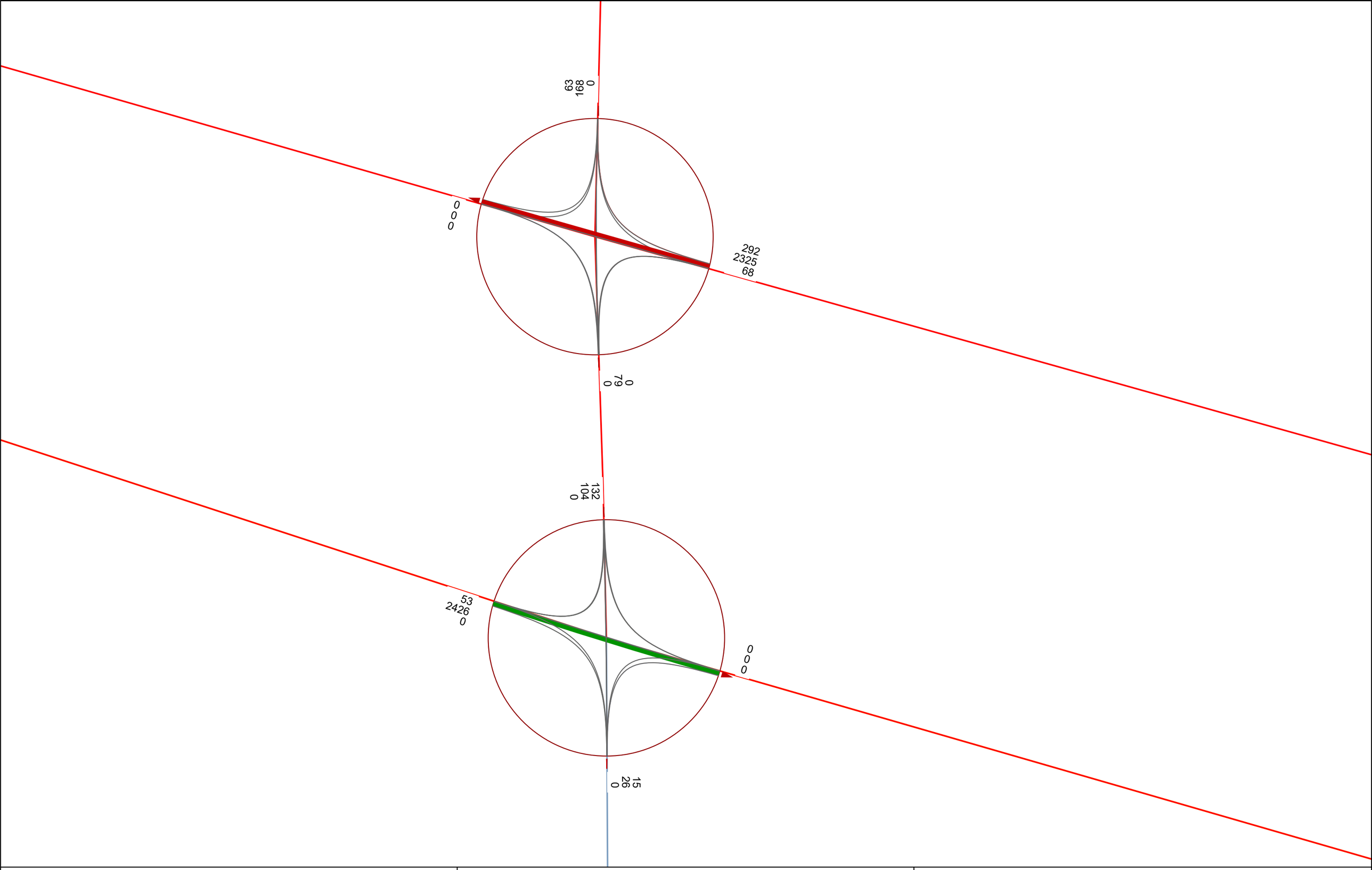
2045 Bearspaw - Burma Rd / Bearspaw Rd / Woodland Rd	Created on: 22.08.2024	WATT Consulting Group



2045 Bearspaw - Hwy 1A / Bearspaw Rd	Created on: 22.08.2024	WATT Consulting Group



2045 Bearspaw - Hwy 1A / Woodland Rd	Created on: 22.08.2024	WATT Consulting Group



2045 Bearspaw - Hwy 1A / Lochend Rd	Created on: 22.08.2024	WATT Consulting Group

APPENDIX B: CAPACITY ANALYSIS REPORTS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	2053	5	7	2509	377	5	5	6	323	5	35
Future Volume (vph)	34	2053	5	7	2509	377	5	5	6	323	5	35
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	155.0		150.0	165.0		185.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.918			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	1742	1683	0	1742	1594	0
Flt Permitted	0.039			0.047			0.889			0.444		
Satd. Flow (perm)	72	3484	1559	86	3484	1559	1630	1683	0	814	1594	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			377		6			35	
Link Speed (k/h)		90			100			50			80	
Link Distance (m)		328.3			229.9			119.9			381.1	
Travel Time (s)		13.1			8.3			8.6			17.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	2053	5	7	2509	377	5	5	6	323	5	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2053	5	7	2509	377	5	11	0	323	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	5.0	10.0		5.0	10.0	
Minimum Split (s)	6.5	24.5	24.5	6.5	24.5	24.5	9.5	18.9		9.5	22.5	
Total Split (s)	6.6	105.1	105.1	6.5	105.0	105.0	9.5	17.4		21.0	28.9	
Total Split (%)	4.4%	70.1%	70.1%	4.3%	70.0%	70.0%	6.3%	11.6%		14.0%	19.3%	
Maximum Green (s)	2.1	100.6	100.6	2.0	100.5	100.5	5.0	12.9		16.5	24.4	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max	Max	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0		5.0			7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		9.0			11.0	
Pedestrian Calls (#/hr)		0	0		0	0		0			0	
Act Effct Green (s)	104.0	103.6	103.6	102.2	101.0	101.0	8.7	10.0		21.9	20.2	
Actuated g/C Ratio	0.77	0.76	0.76	0.75	0.74	0.74	0.06	0.07		0.16	0.15	
v/c Ratio	0.42	0.77	0.00	0.08	0.97	0.30	0.05	0.08		1.32	0.15	
Control Delay	21.4	13.6	0.0	6.9	29.4	1.4	50.0	45.5		214.1	19.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	21.4	13.6	0.0	6.9	29.4	1.4	50.0	45.5		214.1	19.9	
LOS	C	B	A	A	C	A	D	D		F	B	
Approach Delay		13.7			25.7			46.9			192.7	
Approach LOS		B			C			D			F	
Queue Length 50th (m)	1.4	108.4	0.0	0.3	260.5	0.0	1.3	1.2		~116.6	1.2	
Queue Length 95th (m)	6.4	262.4	0.0	1.9	#456.4	9.7	5.0	7.9		#147.1	12.2	
Internal Link Dist (m)		304.3			205.9			95.9			357.1	
Turn Bay Length (m)	155.0		150.0	165.0		185.0						
Base Capacity (vph)	81	2658	1215	89	2592	1256	109	166		244	330	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.42	0.77	0.00	0.08	0.97	0.30	0.05	0.07		1.32	0.12	

Intersection Summary

Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 135.8
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.32
Intersection Signal Delay: 32.4 Intersection LOS: C
Intersection Capacity Utilization 103.8% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 3: Hwy 1A & Bearspaw Road

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	1935	5	37	2291	217	5	5	31	121	5	106
Future Vol, veh/h	64	1935	5	37	2291	217	5	5	31	121	5	106
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	190	-	185	175	-	175	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	64	1935	5	37	2291	217	5	5	31	121	5	106

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2508	0	0	1940	0	0	3285	4645	968	3463	4433	1146
Stage 1	-	-	-	-	-	-	2063	2063	-	2365	2365	-
Stage 2	-	-	-	-	-	-	1222	2582	-	1098	2068	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	178	-	-	299	-	-	~ 4	~ 1	254	~ 3	~ 1	193
Stage 1	-	-	-	-	-	-	56	96	-	~ 36	67	-
Stage 2	-	-	-	-	-	-	190	51	-	227	95	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	178	-	-	299	-	-	-	~ 1	254	-	~ 1	193
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 1	-	-	~ 1	-
Stage 1	-	-	-	-	-	-	36	61	-	~ 23	59	-
Stage 2	-	-	-	-	-	-	69	45	-	~ 117	61	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.3		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	178	-	-	299	-	-	-
HCM Lane V/C Ratio	-	0.36	-	-	0.124	-	-	-
HCM Control Delay (s)	-	36.2	-	-	18.7	-	-	-
HCM Lane LOS	-	E	-	-	C	-	-	-
HCM 95th %tile Q(veh)	-	1.5	-	-	0.4	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	1878	5	36	2199	163	5	11	8	114	21	18
Future Vol, veh/h	22	1878	5	36	2199	163	5	11	8	114	21	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	185	-	60	145	-	150	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	1878	5	36	2199	163	5	11	8	114	21	18

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2362	0	0	1883	0	0	3104	4356	939	3260	4198	1100
Stage 1	-	-	-	-	-	-	1922	1922	-	2271	2271	-
Stage 2	-	-	-	-	-	-	1182	2434	-	989	1927	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	204	-	-	314	-	-	5	~ 2	265	~ 4	~ 2	207
Stage 1	-	-	-	-	-	-	69	113	-	~ 41	75	-
Stage 2	-	-	-	-	-	-	201	62	-	265	112	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	204	-	-	314	-	-	-	~ 2	265	-	~ 2	207
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	~ 2	-	-	~ 2	-
Stage 1	-	-	-	-	-	-	62	101	-	~ 37	66	-
Stage 2	-	-	-	-	-	-	111	55	-	204	100	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0.3		
HCM LOS			-	-

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	-	204	-	-	314	-	-	-
HCM Lane V/C Ratio	-	0.108	-	-	0.115	-	-	-
HCM Control Delay (s)	-	24.8	-	-	17.9	-	-	-
HCM Lane LOS	-	C	-	-	C	-	-	-
HCM 95th %tile Q(veh)	-	0.4	-	-	0.4	-	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	87	5	82	139	40	5	236	88	56	234	20
Future Vol, veh/h	10	87	5	82	139	40	5	236	88	56	234	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	30	-	-	85	-	-	70
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	87	5	82	139	40	5	236	88	56	234	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	726	680	234	648	612	236	254	0	0	324	0	0
Stage 1	346	346	-	246	246	-	-	-	-	-	-	-
Stage 2	380	334	-	402	366	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	340	373	805	383	408	803	1311	-	-	1236	-	-
Stage 1	670	635	-	758	703	-	-	-	-	-	-	-
Stage 2	642	643	-	625	623	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	351	805	295	384	803	1311	-	-	1236	-	-
Mov Cap-2 Maneuver	223	351	-	295	384	-	-	-	-	-	-	-
Stage 1	667	601	-	754	699	-	-	-	-	-	-	-
Stage 2	486	640	-	503	590	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20	28.8	0.1	1.5
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1311	-	-	341	345	803	1236	-	-
HCM Lane V/C Ratio	0.004	-	-	0.299	0.641	0.05	0.045	-	-
HCM Control Delay (s)	7.8	0	-	20	32.3	9.7	8.1	0	-
HCM Lane LOS	A	A	-	C	D	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	1.2	4.2	0.2	0.1	-	-

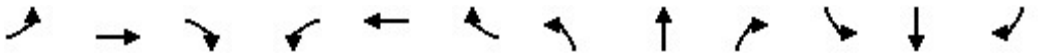
Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	5	5	117	13	6	5	81	89	5	52	5
Future Vol, veh/h	5	5	5	117	13	6	5	81	89	5	52	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	5	5	117	13	6	5	81	89	5	52	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	210	245	55	206	203	126	57	0	0	170	0	0
Stage 1	65	65	-	136	136	-	-	-	-	-	-	-
Stage 2	145	180	-	70	67	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	747	657	1012	752	693	924	1547	-	-	1407	-	-
Stage 1	946	841	-	867	784	-	-	-	-	-	-	-
Stage 2	858	750	-	940	839	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	727	652	1012	739	687	924	1547	-	-	1407	-	-
Mov Cap-2 Maneuver	727	652	-	739	687	-	-	-	-	-	-	-
Stage 1	942	838	-	864	781	-	-	-	-	-	-	-
Stage 2	835	747	-	926	836	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.8	11	0.2	0.6
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1547	-	-	770	740	1407	-	-
HCM Lane V/C Ratio	0.003	-	-	0.019	0.184	0.004	-	-
HCM Control Delay (s)	7.3	0	-	9.8	11	7.6	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.7	0	-	-



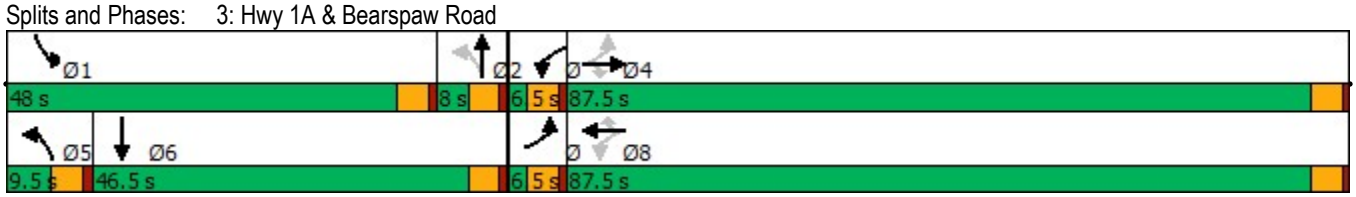
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	2053	5	7	2509	377	5	5	6	323	5	35
Future Volume (vph)	34	2053	5	7	2509	377	5	5	6	323	5	35
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	155.0		150.0	165.0		185.0	0.0		0.0	50.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850		0.918			0.869	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	1742	1683	0	3380	1594	0
Flt Permitted	0.047			0.047						0.950		
Satd. Flow (perm)	86	3484	1559	86	3484	1559	1834	1683	0	3380	1594	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			377		6			35	
Link Speed (k/h)		90			100			50			80	
Link Distance (m)		328.3			229.9			119.9			381.1	
Travel Time (s)		13.1			8.3			8.6			17.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	34	2053	5	7	2509	377	5	5	6	323	5	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	34	2053	5	7	2509	377	5	11	0	323	40	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					

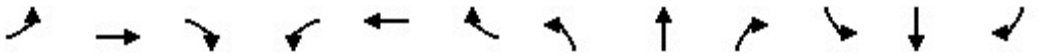
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	5.0	2.0		10.0	10.0	
Minimum Split (s)	6.5	24.5	24.5	6.5	24.5	24.5	9.5	6.5		14.5	14.5	
Total Split (s)	6.5	87.5	87.5	6.5	87.5	87.5	9.5	8.0		48.0	46.5	
Total Split (%)	4.3%	58.3%	58.3%	4.3%	58.3%	58.3%	6.3%	5.3%		32.0%	31.0%	
Maximum Green (s)	2.0	83.0	83.0	2.0	83.0	83.0	5.0	3.5		43.5	42.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None		None	None	
Act Effct Green (s)	86.3	86.0	86.0	84.6	83.4	83.4	5.6	3.5		16.4	16.1	
Actuated g/C Ratio	0.76	0.75	0.75	0.74	0.73	0.73	0.05	0.03		0.14	0.14	
v/c Ratio	0.36	0.78	0.00	0.08	0.98	0.30	0.06	0.19		0.67	0.16	
Control Delay	15.1	13.0	0.0	6.3	31.2	1.4	47.6	49.5		53.9	18.3	
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.1	13.1	0.0	6.3	31.2	1.4	47.6	49.5		53.9	18.3	
LOS	B	B	A	A	C	A	D	D		D	B	
Approach Delay		13.1			27.3			48.9			50.0	
Approach LOS		B			C			D			D	
Queue Length 50th (m)	1.4	106.2	0.0	0.3	255.5	0.0	1.1	1.1		35.9	1.0	
Queue Length 95th (m)	5.5	260.5	0.0	1.9	#420.0	10.2	4.4	7.7		54.1	11.4	
Internal Link Dist (m)		304.3			205.9			95.9			357.1	
Turn Bay Length (m)	155.0		150.0	165.0		185.0				50.0		
Base Capacity (vph)	94	2628	1202	92	2550	1242	86	57		1296	612	
Starvation Cap Reductn	0	57	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.36	0.80	0.00	0.08	0.98	0.30	0.06	0.19		0.25	0.07	

Intersection Summary

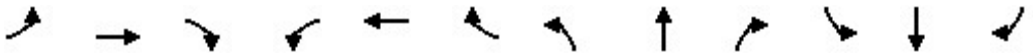
Area Type: Other
Cycle Length: 150
Actuated Cycle Length: 114
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 23.3 — Intersection LOS: C
Intersection Capacity Utilization 94.9% — ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hwy 1A & Bearspaw Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	1935	5	37	2291	217	5	5	31	121	5	106
Future Volume (vph)	64	1935	5	37	2291	217	5	5	31	121	5	106
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	190.0		185.0	175.0		175.0	0.0		15.0	0.0		15.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.898			0.938	
Flt Protected	0.950			0.950				0.994			0.975	
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	0	1637	0	0	1677	0
Flt Permitted	0.061			0.062				0.969			0.814	
Satd. Flow (perm)	112	3484	1559	114	3484	1559	0	1596	0	0	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			217		31			38	
Link Speed (k/h)		100			100			50			80	
Link Distance (m)		269.9			328.3			109.5			388.6	
Travel Time (s)		9.7			11.8			7.9			17.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	64	1935	5	37	2291	217	5	5	31	121	5	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	1935	5	37	2291	217	0	41	0	0	232	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		



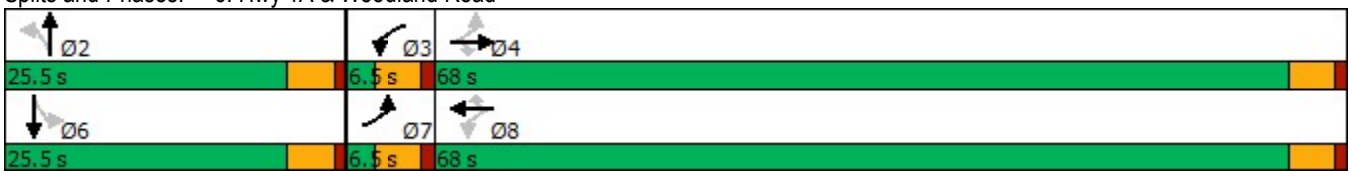
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	2.0	5.0	5.0	2.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	6.5	9.5	9.5	6.5	9.5	9.5	9.5	9.5		9.5	9.5	
Total Split (s)	6.5	68.0	68.0	6.5	68.0	68.0	25.5	25.5		25.5	25.5	
Total Split (%)	6.5%	68.0%	68.0%	6.5%	68.0%	68.0%	25.5%	25.5%		25.5%	25.5%	
Maximum Green (s)	2.0	63.5	63.5	2.0	63.5	63.5	21.0	21.0		21.0	21.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max	Max	None	None		None	None	
Act Effct Green (s)	66.3	65.1	65.1	65.4	63.8	63.8		17.3			17.3	
Actuated g/C Ratio	0.70	0.68	0.68	0.69	0.67	0.67		0.18			0.18	
v/c Ratio	0.57	0.81	0.00	0.33	0.98	0.19		0.13			0.81	
Control Delay	28.5	16.0	0.0	12.4	32.3	1.5		15.9			53.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	28.5	16.0	0.0	12.4	32.3	1.5		15.9			53.8	
LOS	C	B	A	B	C	A		B			D	
Approach Delay		16.3			29.4			15.9			53.8	
Approach LOS		B			C			B			D	
Queue Length 50th (m)	3.2	140.3	0.0	1.8	~229.0	0.0		1.6			35.3	
Queue Length 95th (m)	#11.3	186.3	0.0	4.6	#294.7	7.6		10.1			#67.7	
Internal Link Dist (m)		245.9			304.3			85.5			364.6	
Turn Bay Length (m)	190.0		185.0	175.0		175.0						
Base Capacity (vph)	112	2383	1086	112	2335	1116		377			340	
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	0.57	0.81	0.00	0.33	0.98	0.19		0.11			0.68	

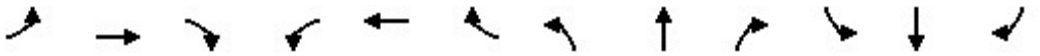
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 95.2			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 25.0		Intersection LOS: C	
Intersection Capacity Utilization 93.0%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

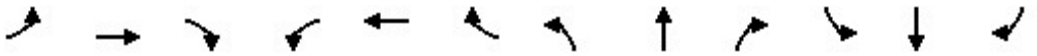
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Hwy 1A & Woodland Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	1878	5	36	2199	163	5	11	8	114	21	18
Future Volume (vph)	22	1878	5	36	2199	163	5	11	8	114	21	18
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	185.0		60.0	145.0		150.0	0.0		0.0	0.0		15.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.955			0.984	
Flt Protected	0.950			0.950				0.990			0.964	
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	0	1734	0	0	1740	0
Flt Permitted	0.071			0.071				0.940			0.766	
Satd. Flow (perm)	130	3484	1559	130	3484	1559	0	1646	0	0	1382	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			20			163		8			8	
Link Speed (k/h)		100			100			50			100	
Link Distance (m)		319.4			269.9			108.2			139.6	
Travel Time (s)		11.5			9.7			7.8			5.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	22	1878	5	36	2199	163	5	11	8	114	21	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	1878	5	36	2199	163	0	24	0	0	153	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		

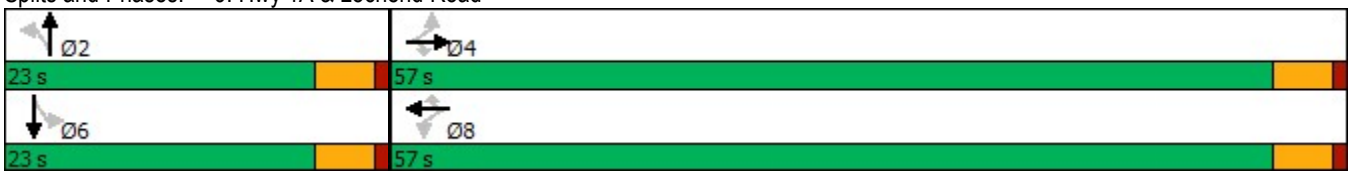


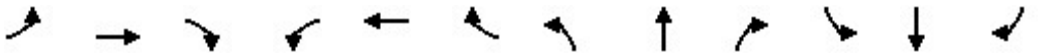
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	57.0	57.0	57.0	57.0	57.0	57.0	23.0	23.0		23.0	23.0	
Total Split (%)	71.3%	71.3%	71.3%	71.3%	71.3%	71.3%	28.8%	28.8%		28.8%	28.8%	
Maximum Green (s)	52.5	52.5	52.5	52.5	52.5	52.5	18.5	18.5		18.5	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)	56.3	56.3	56.3	56.3	56.3	56.3		13.3			13.3	
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.72		0.17			0.17	
v/c Ratio	0.24	0.75	0.00	0.39	0.88	0.14		0.08			0.64	
Control Delay	12.8	10.2	0.4	21.8	15.6	1.2		20.0			40.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	12.8	10.2	0.4	21.8	15.6	1.2		20.0			40.4	
LOS	B	B	A	C	B	A		C			D	
Approach Delay		10.2			14.8			20.0			40.4	
Approach LOS		B			B			C			D	
Queue Length 50th (m)	0.9	74.3	0.0	1.7	108.8	0.0		2.0			20.1	
Queue Length 95th (m)	6.3	129.6	0.3	#15.9	#219.8	5.4		7.6			36.3	
Internal Link Dist (m)		295.4			245.9			84.2			115.6	
Turn Bay Length (m)	185.0		60.0	145.0		150.0						
Base Capacity (vph)	93	2494	1121	93	2494	1162		393			331	
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	0.24	0.75	0.00	0.39	0.88	0.14		0.06			0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 78.7			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 13.7		Intersection LOS: B	
Intersection Capacity Utilization 85.3%		ICU Level of Service E	
Analysis Period (min) 15			

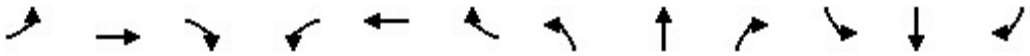
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Hwy 1A & Lochend Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	2521	5	8	2731	477	5	5	6	377	5	166
Future Volume (vph)	117	2521	5	8	2731	477	5	5	6	377	5	166
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	155.0		150.0	165.0		185.0	0.0		0.0	50.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850		0.918			0.854	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	1742	1683	0	3380	1566	0
Flt Permitted	0.045			0.046						0.950		
Satd. Flow (perm)	83	3484	1559	84	3484	1559	1834	1683	0	3380	1566	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			452		6			79	
Link Speed (k/h)		90			100			50			80	
Link Distance (m)		328.3			229.9			119.9			381.1	
Travel Time (s)		13.1			8.3			8.6			17.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	117	2521	5	8	2731	477	5	5	6	377	5	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	2521	5	8	2731	477	5	11	0	377	171	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2					



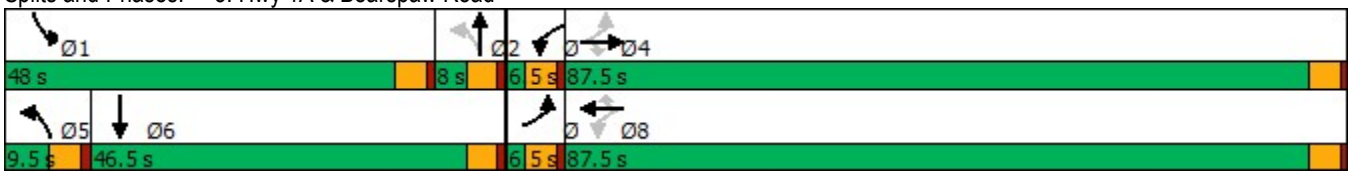
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	5.0	2.0		10.0	10.0	
Minimum Split (s)	6.5	24.5	24.5	6.5	24.5	24.5	9.5	6.5		14.5	14.5	
Total Split (s)	6.5	87.5	87.5	6.5	87.5	87.5	9.5	8.0		48.0	46.5	
Total Split (%)	4.3%	58.3%	58.3%	4.3%	58.3%	58.3%	6.3%	5.3%		32.0%	31.0%	
Maximum Green (s)	2.0	83.0	83.0	2.0	83.0	83.0	5.0	3.5		43.5	42.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None		None	None	
Act Effct Green (s)	89.0	88.6	88.6	85.3	83.3	83.3	6.3	3.5		18.6	19.8	
Actuated g/C Ratio	0.74	0.74	0.74	0.71	0.69	0.69	0.05	0.03		0.15	0.16	
v/c Ratio	1.31	0.98	0.00	0.09	1.13	0.39	0.05	0.20		0.72	0.53	
Control Delay	222.5	31.3	0.0	8.0	86.5	2.1	42.8	51.6		57.3	30.8	
Queue Delay	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	222.5	34.0	0.0	8.0	86.5	2.1	42.8	51.6		57.3	30.8	
LOS	F	C	A	A	F	A	D	D		E	C	
Approach Delay		42.2			73.8			48.9			49.0	
Approach LOS		D			E			D			D	
Queue Length 50th (m)	~11.7	214.1	0.0	0.4	~373.2	1.5	1.1	1.1		42.7	19.1	
Queue Length 95th (m)	#59.7	#437.9	0.0	2.2	#495.7	14.4	4.4	7.8		62.8	44.4	
Internal Link Dist (m)		304.3			205.9			95.9			357.1	
Turn Bay Length (m)	155.0		150.0	165.0		185.0				50.0		
Base Capacity (vph)	89	2564	1176	87	2410	1217	92	54		1225	599	
Starvation Cap Reductn	0	37	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	1.31	1.00	0.00	0.09	1.13	0.39	0.05	0.20		0.31	0.29	

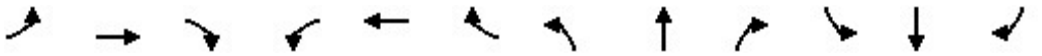
Intersection Summary			
Area Type:	Other		
Cycle Length: 150			
Actuated Cycle Length: 120.4			
Natural Cycle: 150			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.31			
Intersection Signal Delay: 58.6		Intersection LOS: E	
Intersection Capacity Utilization 113.2%		ICU Level of Service H	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

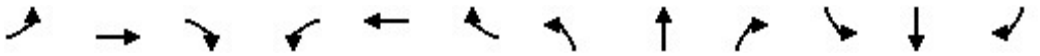
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hwy 1A & Bearspaw Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	2386	5	50	2520	328	5	9	42	211	7	161
Future Volume (vph)	182	2386	5	50	2520	328	5	9	42	211	7	161
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	190.0		185.0	175.0		175.0	0.0		15.0	0.0		15.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.899			0.943	
Flt Protected	0.950			0.950				0.996			0.973	
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	0	1642	0	0	1683	0
Flt Permitted	0.062			0.062				0.972			0.823	
Satd. Flow (perm)	114	3484	1559	114	3484	1559	0	1602	0	0	1423	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65			328		39			34	
Link Speed (k/h)		100			100			50			80	
Link Distance (m)		269.9			328.3			109.5			388.6	
Travel Time (s)		9.7			11.8			7.9			17.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	182	2386	5	50	2520	328	5	9	42	211	7	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	2386	5	50	2520	328	0	56	0	0	379	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		



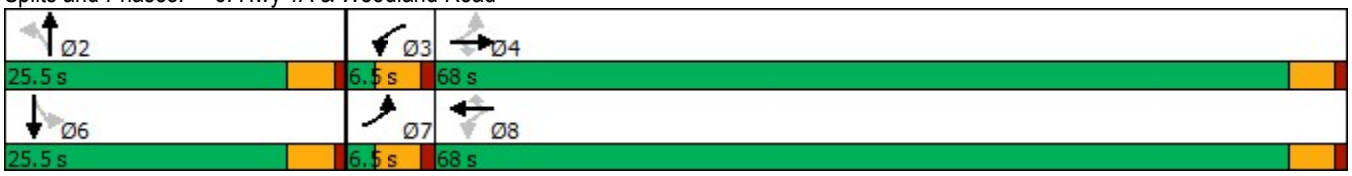
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	2.0	5.0	5.0	2.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	6.5	9.5	9.5	6.5	9.5	9.5	9.5	9.5		9.5	9.5	
Total Split (s)	6.5	68.0	68.0	6.5	68.0	68.0	25.5	25.5		25.5	25.5	
Total Split (%)	6.5%	68.0%	68.0%	6.5%	68.0%	68.0%	25.5%	25.5%		25.5%	25.5%	
Maximum Green (s)	2.0	63.5	63.5	2.0	63.5	63.5	21.0	21.0		21.0	21.0	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max	Max	None	None		None	None	
Act Effct Green (s)	66.4	64.8	64.8	65.5	63.5	63.5		21.0			21.0	
Actuated g/C Ratio	0.66	0.65	0.65	0.66	0.64	0.64		0.21			0.21	
v/c Ratio	1.69	1.06	0.00	0.47	1.14	0.30		0.15			1.17	
Control Delay	362.8	55.8	0.0	19.2	89.3	1.6		16.1			136.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	362.8	55.8	0.0	19.2	89.3	1.6		16.1			136.9	
LOS	F	E	A	B	F	A		B			F	
Approach Delay		77.4			78.1			16.1			136.9	
Approach LOS		E			E			B			F	
Queue Length 50th (m)	~31.0	~273.1	0.0	2.6	~301.7	0.0		2.7			~82.4	
Queue Length 95th (m)	#73.2	#314.7	0.0	#6.0	#343.2	9.0		12.6			#138.3	
Internal Link Dist (m)		245.9			304.3			85.5			364.6	
Turn Bay Length (m)	190.0		185.0	175.0		175.0						
Base Capacity (vph)	108	2257	1032	107	2212	1109		367			325	
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	1.69	1.06	0.00	0.47	1.14	0.30		0.15			1.17	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 130			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.69			
Intersection Signal Delay: 81.0		Intersection LOS: F	
Intersection Capacity Utilization 122.3%		ICU Level of Service H	
Analysis Period (min) 15			

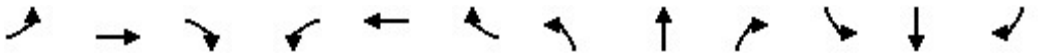
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 6: Hwy 1A & Woodland Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	2426	5	68	2325	292	5	26	15	132	35	63
Future Volume (vph)	53	2426	5	68	2325	292	5	26	15	132	35	63
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	185.0		60.0	145.0		150.0	0.0		0.0	0.0		15.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.956			0.963	
Flt Protected	0.950			0.950				0.995			0.972	
Satd. Flow (prot)	1742	3484	1559	1742	3484	1559	0	1744	0	0	1717	0
Flt Permitted	0.072			0.072				0.969			0.797	
Satd. Flow (perm)	132	3484	1559	132	3484	1559	0	1699	0	0	1408	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			20			292		7			8	
Link Speed (k/h)		100			100			50			100	
Link Distance (m)		319.4			269.9			108.2			139.6	
Travel Time (s)		11.5			9.7			7.8			5.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	2426	5	68	2325	292	5	26	15	132	35	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	2426	5	68	2325	292	0	46	0	0	230	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		



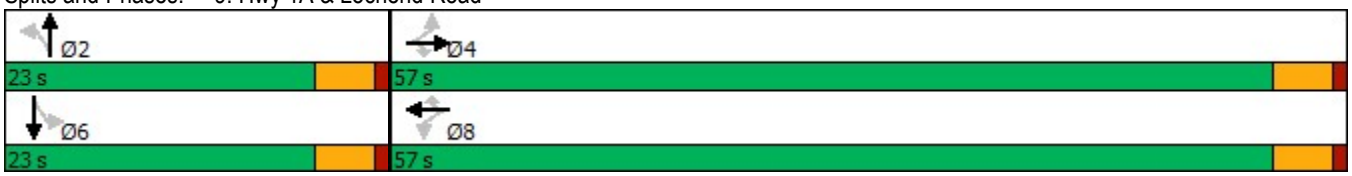
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	57.0	57.0	57.0	57.0	57.0	57.0	23.0	23.0		23.0	23.0	
Total Split (%)	71.3%	71.3%	71.3%	71.3%	71.3%	71.3%	28.8%	28.8%		28.8%	28.8%	
Maximum Green (s)	52.5	52.5	52.5	52.5	52.5	52.5	18.5	18.5		18.5	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	Min	Min	Min	None	None		None	None	
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0		0	0	
Act Effct Green (s)	55.5	55.5	55.5	55.5	55.5	55.5		16.4			16.4	
Actuated g/C Ratio	0.69	0.69	0.69	0.69	0.69	0.69		0.20			0.20	
v/c Ratio	0.59	1.01	0.00	0.76	0.97	0.25		0.13			0.79	
Control Delay	41.1	37.4	0.4	64.2	27.2	1.3		22.7			49.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	41.1	37.4	0.4	64.2	27.2	1.3		22.7			49.3	
LOS	D	D	A	E	C	A		C			D	
Approach Delay		37.4			25.3			22.7			49.3	
Approach LOS		D			C			C			D	
Queue Length 50th (m)	3.9	~214.1	0.0	6.2	~168.7	0.0		4.7			30.9	
Queue Length 95th (m)	#24.6	#258.5	0.3	#19.0	#241.3	7.0		12.7			#60.5	
Internal Link Dist (m)		295.4			245.9			84.2			115.6	
Turn Bay Length (m)	185.0		60.0	145.0		150.0						
Base Capacity (vph)	90	2391	1076	90	2391	1161		394			328	
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	0.59	1.01	0.00	0.76	0.97	0.25		0.12			0.70	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 80.9			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 31.8		Intersection LOS: C	
Intersection Capacity Utilization 96.4%		ICU Level of Service F	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

Splits and Phases: 9: Hwy 1A & Lochend Road



Intersection	
Int Delay, s/veh	127.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	198	7	55	218	66	8	287	98	91	371	27
Future Vol, veh/h	27	198	7	55	218	66	8	287	98	91	371	27
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	30	-	-	85	-	-	70
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	198	7	55	218	66	8	287	98	91	371	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1047	954	371	972	883	287	398	0	0	385	0	0
Stage 1	553	553	-	303	303	-	-	-	-	-	-	-
Stage 2	494	401	-	669	580	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	206	259	675	232	285	752	1161	-	-	1173	-	-
Stage 1	517	514	-	706	664	-	-	-	-	-	-	-
Stage 2	557	601	-	447	500	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	48	231	675	59	254	752	1161	-	-	1173	-	-
Mov Cap-2 Maneuver	48	231	-	59	254	-	-	-	-	-	-	-
Stage 1	512	463	-	700	658	-	-	-	-	-	-	-
Stage 2	337	596	-	228	450	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	278.6	$ 351.6	0.2	1.5
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1161	-	-	162	152	752	1173	-	-
HCM Lane V/C Ratio	0.007	-	-	1.432	1.796	0.088	0.078	-	-
HCM Control Delay (s)	8.1	0	-	278.6	$ 434.1	10.2	8.3	0	-
HCM Lane LOS	A	A	-	F	F	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	14.7	20.2	0.3	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

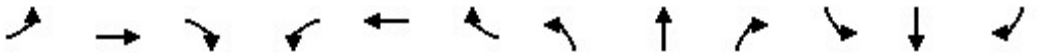
Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	5	5	170	20	16	5	166	210	11	116	5
Future Vol, veh/h	5	5	5	170	20	16	5	166	210	11	116	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	5	5	170	20	16	5	166	210	11	116	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	440	527	119	427	424	271	121	0	0	376	0	0
Stage 1	141	141	-	281	281	-	-	-	-	-	-	-
Stage 2	299	386	-	146	143	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	527	456	933	538	522	768	1467	-	-	1182	-	-
Stage 1	862	780	-	726	678	-	-	-	-	-	-	-
Stage 2	710	610	-	857	779	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	495	450	933	525	515	768	1467	-	-	1182	-	-
Mov Cap-2 Maneuver	495	450	-	525	515	-	-	-	-	-	-	-
Stage 1	859	772	-	723	675	-	-	-	-	-	-	-
Stage 2	672	608	-	838	771	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	15.8	0.1	0.7
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1467	-	-	565	537	1182	-	-
HCM Lane V/C Ratio	0.003	-	-	0.027	0.384	0.009	-	-
HCM Control Delay (s)	7.5	0	-	11.5	15.8	8.1	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	1.8	0	-	-



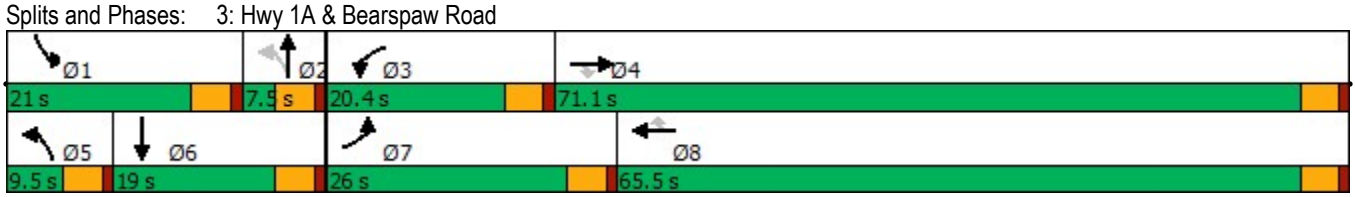
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	117	2521	5	8	2731	477	5	5	6	377	5	166
Future Volume (vph)	117	2521	5	8	2731	477	5	5	6	377	5	166
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	155.0		150.0	165.0		185.0	0.0		0.0	0.0		0.0
Storage Lanes	1		1	1		1	1		0	2		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850		0.918			0.854	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1742	5006	1559	1742	5006	1559	1742	1683	0	3380	1566	0
Flt Permitted	0.950			0.950						0.950		
Satd. Flow (perm)	1742	5006	1559	1742	5006	1559	1834	1683	0	3380	1566	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			136			477		6			166	
Link Speed (k/h)		90			100			50			80	
Link Distance (m)		328.3			229.9			119.9			381.1	
Travel Time (s)		13.1			8.3			8.6			17.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	117	2521	5	8	2731	477	5	5	6	377	5	166
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	2521	5	8	2731	477	5	11	0	377	171	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			7.4			7.4	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2					

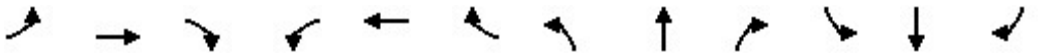
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	2		1	6	
Switch Phase												
Minimum Initial (s)	2.0	20.0	20.0	2.0	20.0	20.0	5.0	2.0		10.0	10.0	
Minimum Split (s)	6.5	24.5	24.5	6.5	24.5	24.5	9.5	6.5		14.5	14.5	
Total Split (s)	26.0	71.1	71.1	20.4	65.5	65.5	9.5	7.5		21.0	19.0	
Total Split (%)	21.7%	59.3%	59.3%	17.0%	54.6%	54.6%	7.9%	6.3%		17.5%	15.8%	
Maximum Green (s)	21.5	66.6	66.6	15.9	61.0	61.0	5.0	3.0		16.5	14.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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		0.0	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None		None	None	
Act Effct Green (s)	12.4	76.1	76.1	6.1	61.3	61.3	5.6	3.0		15.4	15.0	
Actuated g/C Ratio	0.12	0.73	0.73	0.06	0.59	0.59	0.05	0.03		0.15	0.14	
v/c Ratio	0.57	0.69	0.00	0.08	0.93	0.43	0.05	0.20		0.75	0.46	
Control Delay	54.7	10.1	0.0	51.0	27.2	2.5	43.6	46.9		53.8	12.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	54.7	10.1	0.0	51.0	27.2	2.5	43.6	46.9		53.8	12.0	
LOS	D	B	A	D	C	A	D	D		D	B	
Approach Delay		12.1			23.6			45.9			40.7	
Approach LOS		B			C			D			D	
Queue Length 50th (m)	22.5	76.7	0.0	1.6	168.4	0.0	1.0	1.0		37.2	0.9	
Queue Length 95th (m)	42.7	173.6	0.0	6.9	#274.5	15.1	4.3	7.2		#63.8	20.9	
Internal Link Dist (m)		304.3			205.9			95.9			357.1	
Turn Bay Length (m)	155.0		150.0	165.0		185.0						
Base Capacity (vph)	361	3664	1177	267	2950	1114	93	54		539	374	
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	
Reduced v/c Ratio	0.32	0.69	0.00	0.03	0.93	0.43	0.05	0.20		0.70	0.46	

Intersection Summary

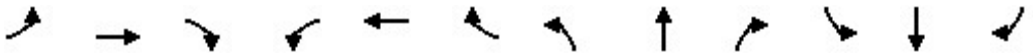
Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 104
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 20.4 — Intersection LOS: C
Intersection Capacity Utilization 89.8% — ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Hwy 1A & Bearspaw Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	182	2386	5	50	2520	328	5	9	42	211	7	161
Future Volume (vph)	182	2386	5	50	2520	328	5	9	42	211	7	161
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	190.0		185.0	175.0		175.0	0.0		15.0	50.0		15.0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.899			0.856	
Flt Protected	0.950			0.950				0.996		0.950		
Satd. Flow (prot)	1742	5006	1559	1742	5006	1559	0	1642	0	1742	1570	0
Flt Permitted	0.950			0.950				0.946		0.556		
Satd. Flow (perm)	1742	5006	1559	1742	5006	1559	0	1560	0	1020	1570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			115			328		42			161	
Link Speed (k/h)		100			100			50			80	
Link Distance (m)		269.9			328.3			109.5			388.6	
Travel Time (s)		9.7			11.8			7.9			17.5	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	182	2386	5	50	2520	328	5	9	42	211	7	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	2386	5	50	2520	328	0	56	0	211	168	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases	7	4		3	8			2		1	6	
Permitted Phases			4			8	2			6		



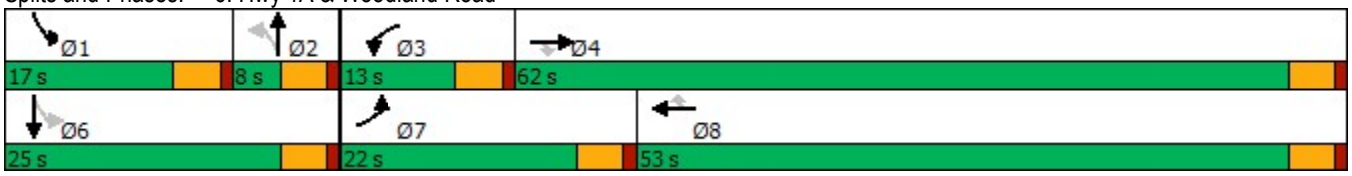
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	2	2		1	6	
Switch Phase												
Minimum Initial (s)	2.0	5.0	5.0	2.0	5.0	5.0	3.5	3.5		5.0	5.0	
Minimum Split (s)	6.5	9.5	9.5	6.5	9.5	9.5	8.0	8.0		9.5	9.5	
Total Split (s)	22.0	62.0	62.0	13.0	53.0	53.0	8.0	8.0		17.0	25.0	
Total Split (%)	22.0%	62.0%	62.0%	13.0%	53.0%	53.0%	8.0%	8.0%		17.0%	25.0%	
Maximum Green (s)	17.5	57.5	57.5	8.5	48.5	48.5	3.5	3.5		12.5	20.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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	0.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5		4.5		4.5	4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max	Max	None	None		None	None	
Act Effct Green (s)	14.4	59.0	59.0	7.5	49.7	49.7		3.5		18.2	18.2	
Actuated g/C Ratio	0.15	0.62	0.62	0.08	0.52	0.52		0.04		0.19	0.19	
v/c Ratio	0.70	0.78	0.00	0.37	0.97	0.34		0.58		0.74	0.39	
Control Delay	53.9	17.5	0.0	51.4	36.4	2.7		44.2		53.1	9.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	53.9	17.5	0.0	51.4	36.4	2.7		44.2		53.1	9.3	
LOS	D	B	A	D	D	A		D		D	A	
Approach Delay		20.0			32.9			44.2			33.6	
Approach LOS		C			C			D			C	
Queue Length 50th (m)	33.5	127.7	0.0	9.3	~171.9	0.0		2.7		37.1	1.1	
Queue Length 95th (m)	54.8	150.4	0.0	20.8	#222.8	13.4		#19.8		#65.4	17.5	
Internal Link Dist (m)		245.9			304.3			85.5			364.6	
Turn Bay Length (m)	190.0		185.0	175.0		175.0				50.0		
Base Capacity (vph)	319	3077	1002	155	2594	966		97		294	464	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.57	0.78	0.00	0.32	0.97	0.34		0.58		0.72	0.36	

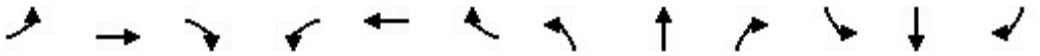
Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 95.9			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 27.4		Intersection LOS: C	
Intersection Capacity Utilization 90.3%		ICU Level of Service E	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

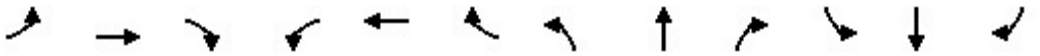
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Hwy 1A & Woodland Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	2426	5	68	2325	292	5	26	15	132	35	63
Future Volume (vph)	53	2426	5	68	2325	292	5	26	15	132	35	63
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	185.0		60.0	145.0		150.0	0.0		0.0	0.0		15.0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850		0.956			0.963	
Flt Protected	0.950			0.950				0.995			0.972	
Satd. Flow (prot)	1742	5006	1559	1742	5006	1559	0	1744	0	0	1717	0
Flt Permitted	0.950			0.950				0.971			0.797	
Satd. Flow (perm)	1742	5006	1559	1742	5006	1559	0	1702	0	0	1408	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			82			292		15			22	
Link Speed (k/h)		100			100			50			100	
Link Distance (m)		319.4			269.9			108.2			139.6	
Travel Time (s)		11.5			9.7			7.8			5.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	53	2426	5	68	2325	292	5	26	15	132	35	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	2426	5	68	2325	292	0	46	0	0	230	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2	1	1	2	1	1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4			8	2			6		

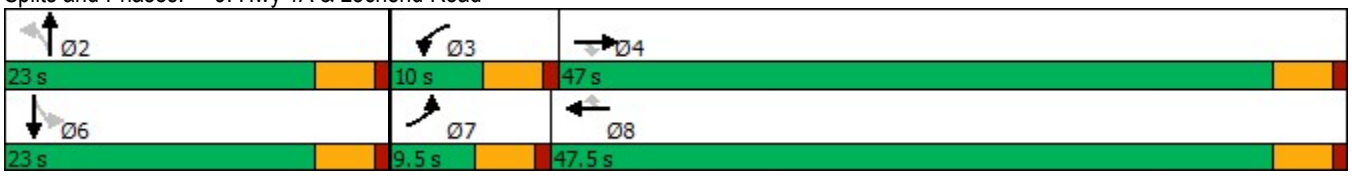


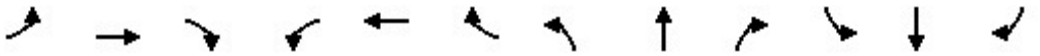
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Minimum Split (s)	9.5	22.5	22.5	9.5	22.5	22.5	22.5	22.5		22.5	22.5	
Total Split (s)	9.5	47.0	47.0	10.0	47.5	47.5	23.0	23.0		23.0	23.0	
Total Split (%)	11.9%	58.8%	58.8%	12.5%	59.4%	59.4%	28.8%	28.8%		28.8%	28.8%	
Maximum Green (s)	5.0	42.5	42.5	5.5	43.0	43.0	18.5	18.5		18.5	18.5	
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5		3.5	3.5	
All-Red Time (s)	1.0	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)	4.5	4.5	4.5	4.5	4.5	4.5		4.5			4.5	
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	Min	Min	None	Min	Min	None	None		None	None	
Walk Time (s)		7.0	7.0		7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)		11.0	11.0		11.0	11.0	11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)		0	0		0	0	0	0		0	0	
Act Effct Green (s)	5.0	43.7	43.7	5.5	46.0	46.0		15.4			15.4	
Actuated g/C Ratio	0.07	0.58	0.58	0.07	0.61	0.61		0.20			0.20	
v/c Ratio	0.46	0.84	0.01	0.54	0.77	0.28		0.13			0.76	
Control Delay	50.0	18.5	0.0	53.1	15.0	2.0		19.3			43.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	50.0	18.5	0.0	53.1	15.0	2.0		19.3			43.2	
LOS	D	B	A	D	B	A		B			D	
Approach Delay		19.1			14.5			19.3			43.2	
Approach LOS		B			B			B			D	
Queue Length 50th (m)	7.8	109.8	0.0	10.0	99.5	0.0		3.7			28.8	
Queue Length 95th (m)	#21.1	#141.3	0.0	#26.7	126.7	10.2		11.7			#56.9	
Internal Link Dist (m)		295.4			245.9			84.2			115.6	
Turn Bay Length (m)	185.0		60.0	145.0		150.0						
Base Capacity (vph)	115	2884	933	126	3036	1060		428			361	
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	0.46	0.84	0.01	0.54	0.77	0.28		0.11			0.64	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 75.9			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 17.9		Intersection LOS: B	
Intersection Capacity Utilization 83.6%		ICU Level of Service E	
Analysis Period (min) 15			

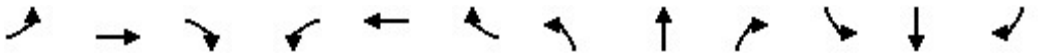
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Hwy 1A & Lochend Road





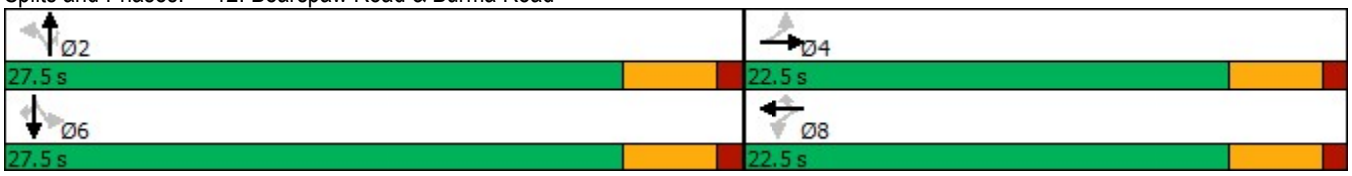
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	198	7	55	218	66	8	287	98	91	371	27
Future Volume (vph)	27	198	7	55	218	66	8	287	98	91	371	27
Ideal Flow (vphpl)	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850	1850
Storage Length (m)	0.0		0.0	0.0		30.0	0.0		85.0	0.0		70.0
Storage Lanes	0		0	0		1	0		1	0		1
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996				0.850			0.850			0.850
Flt Protected		0.994			0.990			0.999			0.990	
Satd. Flow (prot)	0	1816	0	0	1816	1559	0	1832	1559	0	1816	1559
Flt Permitted		0.930			0.907			0.987			0.882	
Satd. Flow (perm)	0	1699	0	0	1663	1559	0	1810	1559	0	1617	1559
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4				66			98			33
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		331.2			263.6			381.1			126.5	
Travel Time (s)		14.9			11.9			17.1			5.7	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	198	7	55	218	66	8	287	98	91	371	27
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	232	0	0	273	66	0	295	98	0	462	27
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2	1	1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	6.1	30.5		6.1	30.5	6.1	6.1	30.5	6.1	6.1	30.5	6.1
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	6.1	1.8		6.1	1.8	6.1	6.1	1.8	6.1	6.1	1.8	6.1
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8	8	2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	27.5	27.5	27.5	27.5	27.5	27.5
Total Split (%)	45.0%	45.0%		45.0%	45.0%	45.0%	55.0%	55.0%	55.0%	55.0%	55.0%	55.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	23.0	23.0	23.0	23.0	23.0	23.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		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
Total Lost Time (s)		4.5			4.5	4.5		4.5	4.5		4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None	None	Min	Min	Min	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)		11.6			11.8	11.8		19.9	19.9		19.9	19.9
Actuated g/C Ratio		0.32			0.33	0.33		0.55	0.55		0.55	0.55
v/c Ratio		0.43			0.51	0.12		0.30	0.11		0.52	0.03
Control Delay		13.4			14.8	4.3		8.4	2.6		11.2	3.1
Queue Delay		0.0			0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		13.4			14.8	4.3		8.4	2.6		11.2	3.1
LOS		B			B	A		A	A		B	A
Approach Delay		13.4			12.8			6.9			10.7	
Approach LOS		B			B			A			B	
Queue Length 50th (m)		10.0			12.4	0.0		10.6	0.0		19.4	0.0
Queue Length 95th (m)		28.5			34.4	5.5		29.2	5.5		52.9	2.6
Internal Link Dist (m)		307.2			239.6			357.1			102.5	
Turn Bay Length (m)						30.0			85.0			70.0
Base Capacity (vph)		917			896	870		1234	1094		1103	1074
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		0.25			0.30	0.08		0.24	0.09		0.42	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 36.2			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 10.6		Intersection LOS: B	
Intersection Capacity Utilization 83.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 12: Bearspaw Road & Burma Road



APPENDIX C: SIGNAL WARRANTS

RVC Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Bearspaw Rd	Direction (EW or NS)	NS
Side Street (name)	Burma Rd	Direction (EW or NS)	EW
Quadrant / Int #		Comments	2045 Horizon
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET		

Road Authority:	RVC
City:	Rocky View County, AB
Analysis Date:	2024 Aug 21, Wed
Count Date:	2024 Jul 26, Fri
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Bearspaw Rd	NB		1				1		1
Bearspaw Rd	SB		1				1	50	1
Burma Rd	WB				1				
Burma Rd	EB		1				1		
Are the Burma Rd WB right turns significantly impeded by through movements? (y/n)							n		
							n		

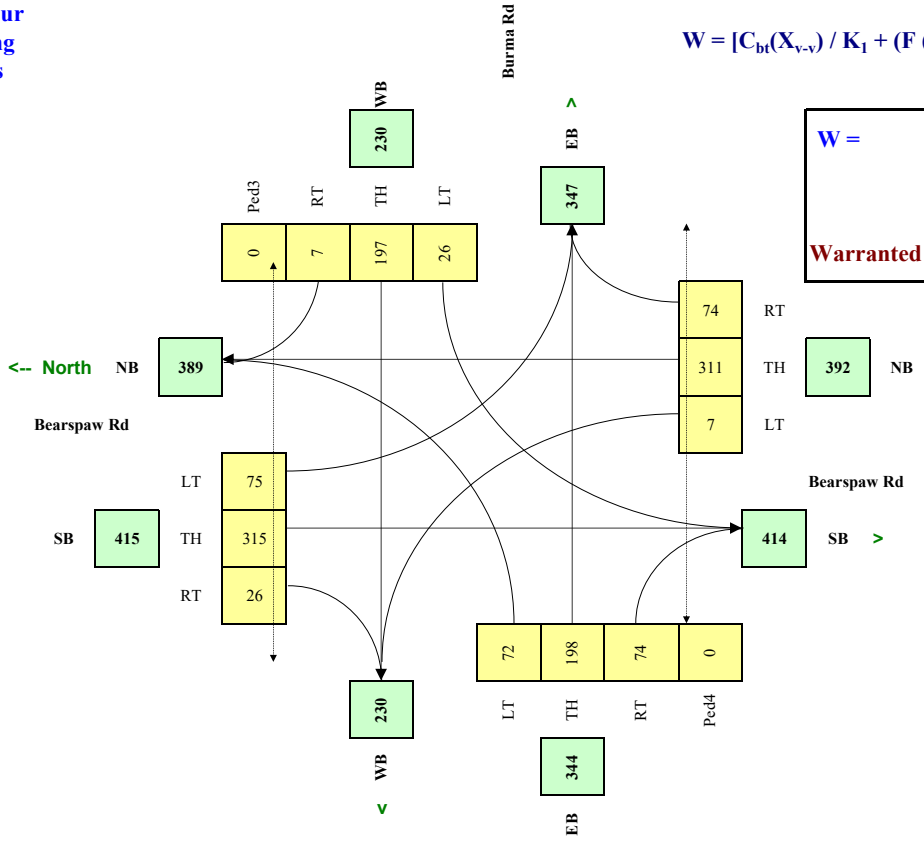
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	44,568
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Bearspaw Rd	NS	80	2.0%	n	14.0
Burma Rd	EW	80	2.0%	n	

Set Peak Hours

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
7:00 - 8:00	6	334	50	59	258	24	24	196	7	88	178	82				
8:00 - 9:00	6	334	50	59	258	24	24	196	7	88	178	82				
11:00 - 12:00	7	311	74	75	315	26	26	197	7	72	198	74				
12:00 - 13:00	7	311	74	75	315	26	26	197	7	72	198	74				
16:00 - 17:00	8	287	98	91	371	27	27	198	7	55	218	66				
17:00 - 18:00	8	287	98	91	371	27	27	198	7	55	218	66				
Total (6-hour peak)	42	1,864	444	450	1,888	154	154	1,182	42	430	1,188	444	0	0	0	0
Average (6-hour peak)	7	311	74	75	315	26	26	197	7	72	198	74	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 =	178	178	0
		Veh	*Ped*

Warranted

RESET SHEET

ATEC / RVC Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Highway 1A	Direction (EW or NS)	EW
Side Street (name)	Lochend Rd	Direction (EW or NS)	NS
Quadrant / Int #		Comments	2035 Horizon

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Road Authority:	ATEC / RVC
City:	Rocky View County, AB
Analysis Date:	2024 Jul 29, Mon
Count Date:	2024 Jul 26, Fri
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Highway 1A	WB	1		2			1		2
Highway 1A	EB	1		2			1	50	2
Lochend Rd	NB				1				
Lochend Rd	SB		1				1		
Are the Lochend Rd NB right turns significantly impeded by through movements? (y/n)							n		
							n		

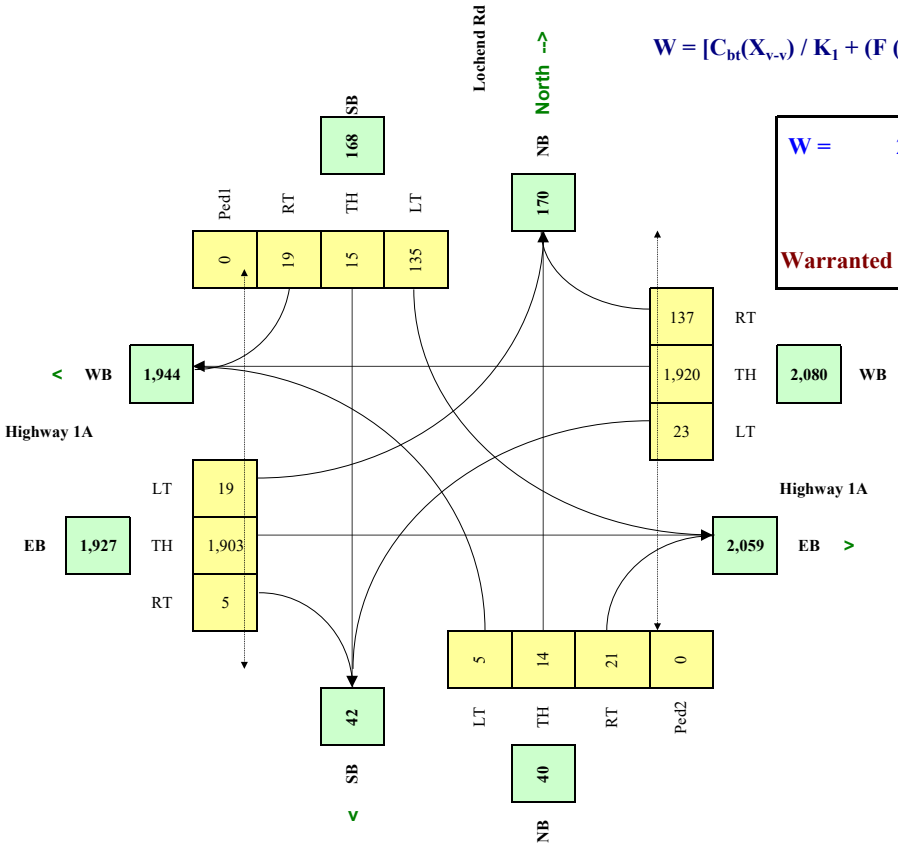
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	44,568
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 1A	EW	100	2.0%	n	14.0
Lochend Rd	NS	50	2.0%	n	

Set Peak Hours

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
7:00 - 8:00	5	16	33	151	11	20	8	1660	106	16	1962	5				
8:00 - 9:00	5	16	33	151	11	20	8	1660	106	16	1962	5				
11:00 - 12:00	5	14	21	135	15	19	23	1920	137	19	1903	5				
12:00 - 13:00	5	14	21	135	15	19	23	1920	137	19	1903	5				
16:00 - 17:00	5	12	9	118	18	18	37	2180	168	22	1844	5				
17:00 - 18:00	5	12	9	118	18	18	37	2180	168	22	1844	5				
Total (6-hour peak)	30	84	126	808	88	114	136	11,520	822	114	11,418	30	0	0	0	0
Average (6-hour peak)	5	14	21	135	15	19	23	1,920	137	19	1,903	5	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 =	256	256	0
		Veh	*Ped*

Warranted

RESET SHEET

ATEC / RVC Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Highway 1A	Direction (EW or NS)	EW
Side Street (name)	Woodland Rd	Direction (EW or NS)	NS
Quadrant / Int #		Comments	2035 Horizon

for Warrant Calculation Results, please hit 'Page Down'

CHECK SHEET

Road Authority:	ATEC / RVC
City:	Rocky View County, AB
Analysis Date:	2024 Jul 29, Mon
Count Date:	2024 Jul 26, Fri
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Highway 1A	WB	1		2			1		2
Highway 1A	EB	1		2			1	50	2
Woodland Rd	NB		1				1		
Woodland Rd	SB		1				1		
							n		
							n		

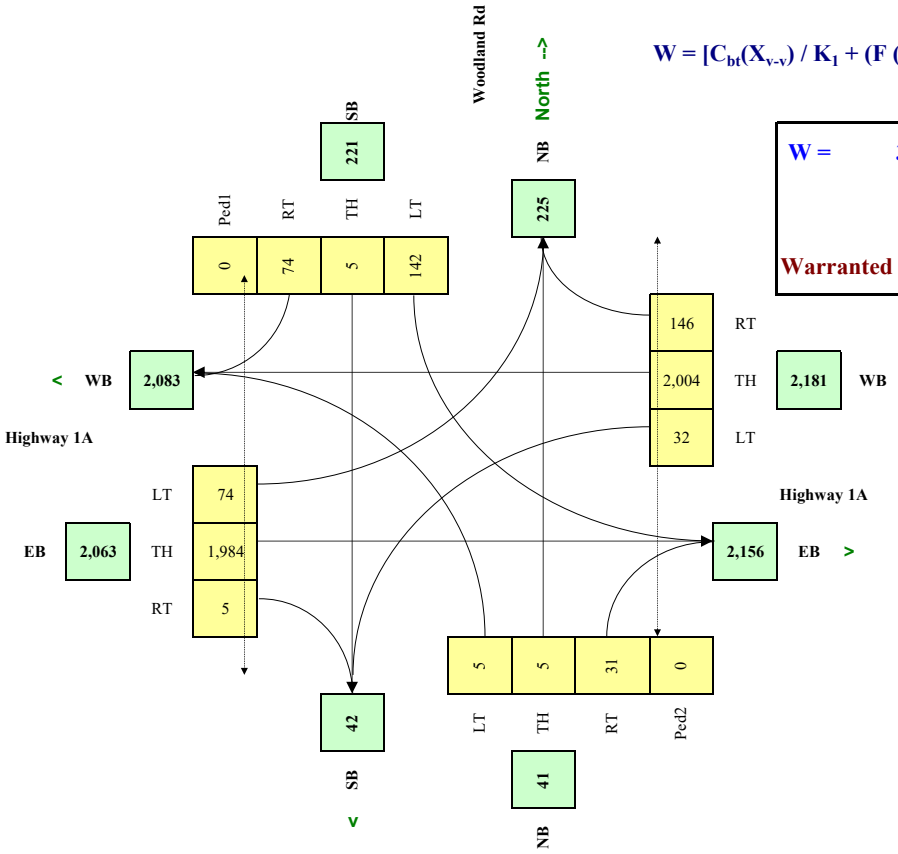
Demographics		
Elem. School/Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	44,568
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Highway 1A	EW	100	2.0%	n	14.0
Woodland Rd	NS	80	2.0%	n	

Set Peak Hours

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
7:00 - 8:00	5	5	33	171	5	68	26	1704	101	72	2074	5				
8:00 - 9:00	5	5	33	171	5	68	26	1704	101	72	2074	5				
11:00 - 12:00	5	5	31	142	5	74	32	2004	146	74	1984	5				
12:00 - 13:00	5	5	31	142	5	74	32	2004	146	74	1984	5				
16:00 - 17:00	5	5	29	112	5	80	37	2304	190	76	1893	5				
17:00 - 18:00	5	5	29	112	5	80	37	2304	190	76	1893	5				
Total (6-hour peak)	**30**	**30**	**186**	**850**	**30**	**444**	**190**	**12,024**	**874**	**444**	**11,902**	**30**	**0**	**0**	**0**	**0**
Average (6-hour peak)	**5**	**5**	**31**	**142**	**5**	**74**	**32**	**2,004**	**146**	**74**	**1,984**	**5**	**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 =	395	395	0
		Veh	*Ped*

Warranted

RESET SHEET

APPENDIX D: TRIP GENERATION AND CELL-BY-CELL ASSIGNMENT DATA

2035 Horizon - Existing / Built Out										
LAND USE	GFA (ft^2)	UNITS	TRIP GENERATION RATE				TRIPS GENERATED PM PEAK HOUR			ITE LU
			PM				TOTAL	IB	OB	
			RATE		IB	OB				
Single Family Detached Housing		1355	0.94	/ unit	63%	37%	1,273	802	471	ITE 210
Multi-Family Housing (Mid-Rise)		12	0.39	/ unit	61%	39%	5	3	2	ITE 221
						Total	**1,278**	**805**	**473**	

2035 Horizon - Future										
LAND USE	GFA (ft^2)	UNITS	TRIP GENERATION RATE				TRIPS GENERATED PM PEAK HOUR			ITE LU
			PM				TOTAL	IB	OB	
			RATE		IB	OB				
Single Family Detached Housing		3043	0.94	/ unit	63%	37%	2,860	1,802	1,058	ITE 210
Shopping Plaza (40-150k)	94,500		9.03	/ 1,000 sq. ft.	48%	52%	854	410	444	ITE 821
						Total	**3,714**	**2,212**	**1,502**	

2035 Horizon										
Zone #	**Description**	**Multi-Family**	**Single Family**	**Industrial**	**Health**	**Other**	**Institutional / Office**	**Retail**	**Inbound**	**Outbound**
124	Country Residential - Bearspaw		6900						584	369
127	Future Development - Existing 17 Houses		105						9	6
128	Future Development - Existing 40 Houses		280						24	15
129	Future Development - Existing 42 Houses		300						25	16
130	Future Development - Existing 85 Houses		500						42	27
132	Country Residential - Bearspaw		300						25	16
133	Country Residential - Bearspaw		300						25	16
134	Country Residential - Bearspaw		650						55	35
135	Country Residential - Bearspaw		650						55	35
136	Country Residential - Bearspaw		650						55	35
137	Country Residential - Bearspaw		1100						93	59
138	Country Residential - Bearspaw		650						55	35
139	Country Residential - Bearspaw		650						55	35
140	Country Residential - Bearspaw		1100						93	59
141	Country Residential - Bearspaw		300						25	16
142	Built Out - 185 Houses		1050				3	3	91	59
143	Country Residential - Bearspaw		650						55	35
144	Country Residential - Bearspaw		300						25	16
146	Country Residential - Bearspaw		2900						246	155
147	Country Residential - Bearspaw		2900						246	155
148	Country Residential - Bearspaw		650						55	35
150	Built Out - 380 Houses		2200	2			1	2	187	119
151	Built Out - 75 Houses		420	2			1	2	36	24
159	Built Out - 46 Houses		300						25	16
160	Built Out - 80 Houses		445						38	24
161	Bearspaw - Community Core						310	705	412	446
162	Glendale Ranch - 7 Houses		38						3	2
164	Indigo Hills - 315 SF / 12 MF	65	2755			3		3	240	152
420	Glendale Road - 25 Houses		160						14	9
421	Bearspaw Country Residential - 58 Houses		350						30	19
	Total:	**65**	**29553**	**4**	**3**	**315**	**10**	**713**	**2925**	**2038**

2045 Horizon - Existing / Built Out										
LAND USE	GFA (ft^2)	UNITS	TRIP GENERATION RATE				TRIPS GENERATED PM PEAK HOUR			ITE LU
			PM				TOTAL	IB	OB	
			RATE		IB	OB				
Single Family Detached Housing		1390	0.94	/ unit	63%	37%	1,306	823	483	ITE 210
Multi-Family Housing (Mid-Rise)		12	0.39	/ unit	61%	39%	5	3	2	ITE 221
						Total	**1,311**	**826**	**485**	

2045 Horizon - Future										
LAND USE	GFA (ft^2)	UNITS	TRIP GENERATION RATE				TRIPS GENERATED PM PEAK HOUR			ITE LU
			PM				TOTAL	IB	OB	
			RATE		IB	OB				
Single Family Detached Housing		4010	0.94	/ unit	63%	37%	3,770	2,375	1,395	ITE 210
Shopping Plaza (40-150k)	189,000		9.03	/ 1,000 sq. ft.	48%	52%	1,706	819	887	ITE 821
						Total	**5,476**	**3,194**	**2,282**	

2045 Horizon										
Zone #	**Description**	**Multi-Family**	**Single Family**	**Industrial**	**Health**	**Other**	**Office**	**Retail**	**Inbound**	**Outbound**
124	Country Residential - Bearspaw		8325						447	287
127	Future Development - Existing 17 Houses		200						11	7
128	Future Development - Existing 40 Houses		520						28	18
129	Future Development - Existing 42 Houses		550						30	19
130	Future Development - Existing 85 Houses		900						49	32
132	Country Residential - Bearspaw		1575						84	54
133	Country Residential - Bearspaw		1575						85	56
134	Country Residential - Bearspaw		2075						112	74
135	Country Residential - Bearspaw		2075						113	74
136	Country Residential - Bearspaw		2075						112	71
137	Country Residential - Bearspaw		2575						139	89
138	Country Residential - Bearspaw		2075						112	74
139	Country Residential - Bearspaw		2075						113	74
140	Country Residential - Bearspaw		2575						139	92
141	Country Residential - Bearspaw		1325						71	46
142	Built Out - 185 Houses		1920				2	4	2	104	68
143	Country Residential - Bearspaw		2075						112	74
144	Country Residential - Bearspaw		1325						71	47
146	Country Residential - Bearspaw		4325						232	148
147	Country Residential - Bearspaw		4325						233	153
148	Country Residential - Bearspaw		2075						112	74
150	Built Out - 380 Houses		3880	2			1	2	1	212	140
151	Built Out - 75 Houses		750	2			1	2	1	41	28
159	Built Out - 46 Houses		550						30	19
160	Built Out - 80 Houses		800						43	29
161	Bearspaw - Community Core						860		2020	819	897
162	Glendale Ranch - 7 Houses		75						4	3
164	Indigo Hills - 315 SF / 12 MF	200	4750			10		10	10	269	177
420	Glendale Road - 60 Houses		630						34	23
421	Bearspaw Country Residential - 58 Houses		620						34	22
	Total:	**200**	**58595**	**4**	**10**	**864**	**18**	**2034**	**3994**	**2967**