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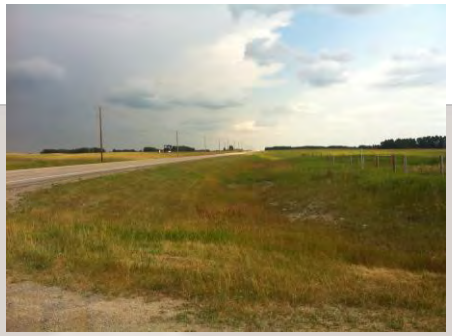
SUMMIT RESOURCE DEVELOPMENT

TRANSPORTATION IMPACT ASSESSMENT





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SUMMIT RESOURCE DEVELOPMENT

Transportation Impact Assessment

August 18, 2014

PERMIT TO PRACTICE
D. A. WATT CONSULTING GROUP LTD.
Signature _____
Date August 18, 2014
PERMIT NUMBER: P 3818
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Prepared for:	**Summit Aggregates Ltd.**
Prepared by:	**Watt Consulting Group**
Our File:	**3179.T01**
Date:	**August 18, 2014**

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1.0 BACKGROUND

1.1 Site Location

Watt Consulting Group (WCG) was retained by Summit Aggregates Ltd. to complete a Transportation Impact Assessment (TIA) for the proposed gravel pit located at NW 31-26-3-W5M south of Highway 567 and east of Highway 22. Access to the site will be provided via Range Road 40 directly west of the site. **Figure 1** illustrates the location of the site.

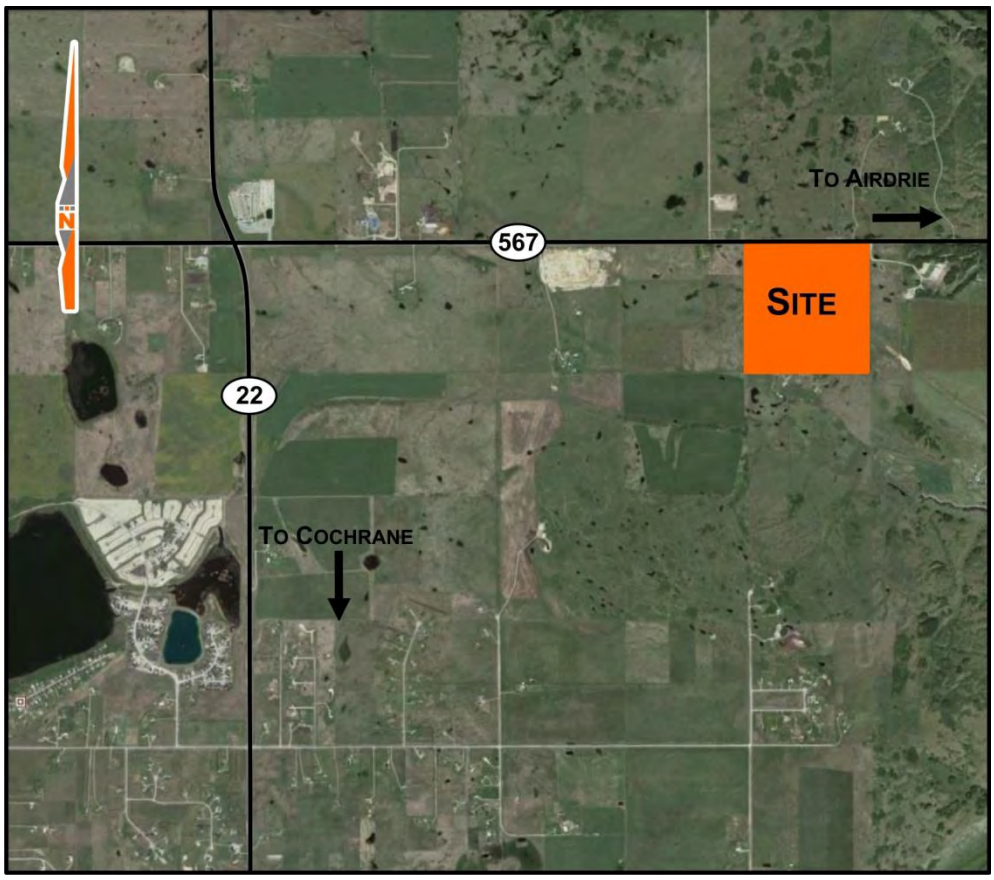


Figure 1: Site Context

1.2 Scope of Work

The study requirements were discussed with Alberta Transportation (AT) staff. The following scope of work was agreed on in order to address AT's requirements for the TIA:

- Site assessment of the sight distance at the intersection of Highway 567 and Range Road 40
- Traffic generation by the site

    - Number of trucks expected during the a.m. and p.m. peak hours is to be provided by Summit Aggregates Ltd.
- Traffic analysis of the capacity and operational conditions at the intersection of Highway 567 and the access road for three conditions:
    - Opening day
    - 10 year horizon
    - 20 year horizon
- Identification of the improvements required at the access intersection to accommodate the gravel pit traffic

Correspondence with Alberta Transportation regarding the scope can be found in **Appendix E**.

2.0 OPENING DAY CONDITIONS

Opening Day conditions were assumed to take place in 2014, and therefore volumes used in this scenario reflect the existing volumes added to the site generated traffic.

As per discussions with Summit Aggregate Ltd., the gravel pit is expected to operate 12 hours per day. 40 tonnes of gravel per truck load is expected, with 2400 tonnes per day at opening day and 4320 tonnes per day at peak production. At peak production with the expected tonnage per day and per truck, 9 trucks per day are expected. However, to account for different truck sizes and loads, a peak hour volume of 12 trucks per hour was assumed in the analysis. Because the timing of peak production is unknown, the volume of 12 trucks per hour was used for all analysis scenarios.

2.1 Existing Road Network

The proposed development is located on the south side of Highway 567 between Highway 22 and Highway 766 (as shown in **Figure 1**). The site will be accessed via the Range Road 40 west of the proposed development. The analysis included one intersection; Highway 567 and Range Road 40.

- **Highway 567** is a rural, undivided, two lane highway with a posted speed of 100km/hr
- The **Range Road 40** is a rural, one lane, unpaved roadway

The opening day traffic analysis was evaluated using the existing lane configuration and traffic controls as shown in **Figure 2**.

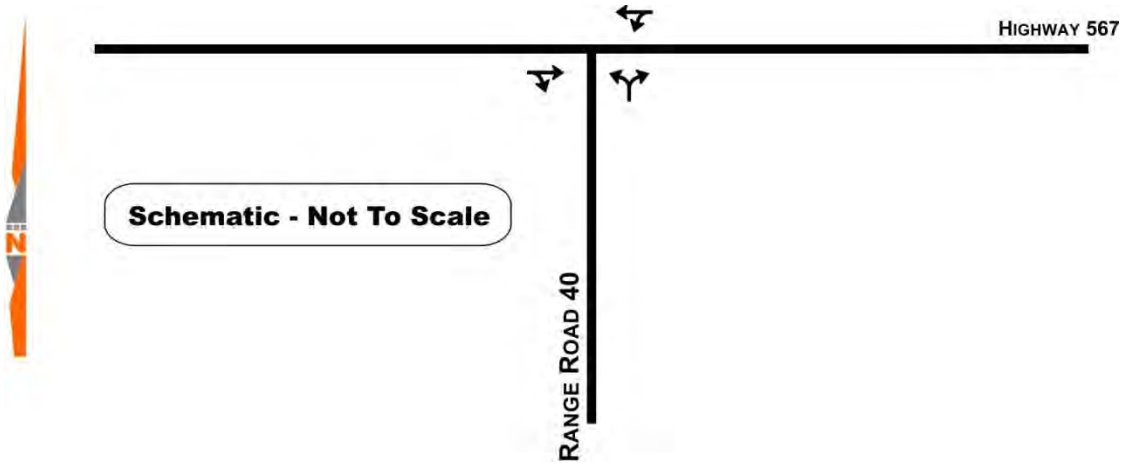


Figure 2: Existing Laning

2.2 Intersection Performance Criteria

The operating conditions during the peak hours at the study intersection were evaluated using the Synchro/SimTraffic 7.0 software package (which is based on the methodology outlined in the U.S. Highway Capacity Manual[1]). For unsignalized (stop-controlled) intersections, the level-of-service (LOS) is based on the computed delays on each of the critical movements. LOS 'A' represents minimal delays for minor-street traffic movements, and LOS 'F' represents a scenario with an insufficient number of gaps on the major street for minor-street motorists to complete their movements without significant delays.
Table 1 illustrates the LOS criteria for unsignalized intersections, as summarized in the Highway Capacity Manual.

Table 1: Level of Service Criteria

Level of Service (LOS)	Average Delay for UNSIGNALIZED Intersection Movements
A	0 – 10 seconds per vehicle
B	> 10 – 15 seconds per vehicle
C	> 15 – 25 seconds per vehicle
D	> 25 – 35 seconds per vehicle
E	> 35 – 50 seconds per vehicle
F	> 50 seconds per vehicle

The operating conditions for any type of intersection can also be expressed in terms of volume-to-capacity (v/c) ratio. Alberta Transportation TIA guidelines define acceptable operating conditions as LOS C in rural areas and LOS D in urban areas with a v/c ratio of 0.90 or less.

2.3 Opening Day Traffic Volumes

Through volumes on Highway 567 were obtained using AT counts at the intersection of Highway 567 and Highway 766.

The count at the intersection of Highway 567 and Highway 22 was initially analyzed for through volumes due to its close proximity to the study intersection. However, the through volumes on Highway 567 were considered unrepresentative of the through volumes at the site access because they include traffic destined to the gas station/RV park located at the NE corner of Highway 567 and Highway 22. Consequently, through volumes on Highway 567 recorded at the intersection of Highway 567 & Highway 766 were used in the analysis as there are no significant traffic generators between the site access and the intersection of Highway 567 & Highway 766

[1] Transportation Research Board, National Research Council. Highway Capacity Manual 2000. Washington, D.C. 2000.

Turning volumes into and out of the site were provided by Summit Aggregate's estimates of peak hour site traffic. The expected number of trucks at maximum production is 12 per hour. **Figure 3** summarizes the opening day volumes. Traffic counts from AT are attached in **Appendix A** and correspondence with Summit Aggregates regarding site traffic is attached in **Appendix B**.

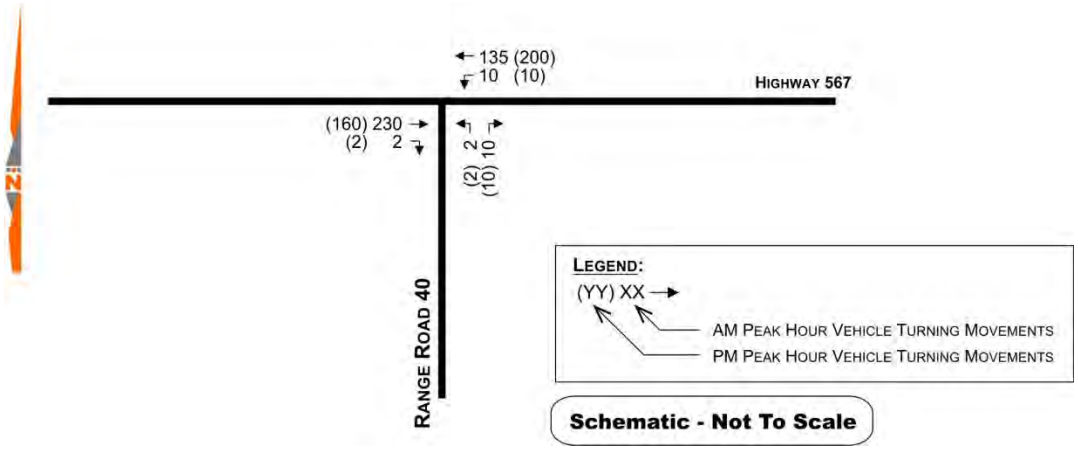


Figure 3: Opening Day Volumes

2.4 Opening Day Operating Conditions

The a.m. and p.m. peak hour traffic conditions for the opening day scenario were assessed in Synchro using the lane configurations and traffic controls shown in **Figure 2** and the traffic volumes shown in **Figure 3**. The results are shown in **Table 2** and full Synchro outputs are attached in **Appendix C**.

Table 2: Opening Day Operating Conditions

INTERSECTION / MOVEMENT			AM PEAK HOUR				PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 567 / Range Road 40 (Unsignalized)	EB	Right/Through	0.15	A	0.0	0.0	0.11	A	0.0	0.0
	WB	Left/Through	0.01	A	0.7	0.3	0.01	A	0.5	0.3
	NB	Left/Right	0.02	B	11.6	0.6	0.02	B	11.0	0.5

Table 2 shows that all movements operate at a LOS B or better with all v/c ratios below the 0.90 threshold.

3.0 POST DEVELOPMENT 10 YEAR HORIZON

3.1 Growth Rate

A yearly growth rate was used to estimate the traffic volumes for the 10 and 20 year development horizons. This growth rate was obtained using permanent count stations available on AT's website. For comparison purposes, AADT's at three count stations were evaluated to estimate a growth rate:

- Highway 22 – 1.1km north of the intersection of Highway 22 & Highway 567
- Highway 567 – East of Highway 22, north of Cochrane
- Highway 567 – West of Highway 766, northeast of Cochrane

It was found that the two count stations closest to Highway 22 (Highway 22 – 1.1km north of the intersection of Highway 22 & Highway 567, and Highway 567 – East of Highway 22, north of Cochrane) had consistent growth in the past ten years, suggesting that growth in these areas within the foreseeable future would continue in this pattern (assuming no major development). However, the third count station experienced a sudden jump in the last recorded year (2013). For this reason the AADT recorded for this count station in 2013 was considered an outlier and the 10 year growth factor at this count station was calculated using AADT's from 2002-2012. This resulting growth factor (4%) was used in the 10 and 20 year horizon year analyses. AADT's for all three count stations and growth rate calculations can be found in **Appendix A**.

3.2 Trip Generation

As stated previously, a conservative site traffic volume of 12 trucks was used for the inbound and outbound volumes in the a.m. and p.m. peak periods, for all analysis scenarios. This volume is conservative as Summit Aggregates estimates that 9 trucks per hour during peak production.

3.3 Trip Distribution

Site traffic was distributed based on nearby major traffic destinations. It was assumed that most traffic would be either going to or coming from Calgary or Airdrie (east) and the rest would be going to or coming from Cochrane (west). **Figure 4** illustrates this distribution.

Table 3: Growth Rate

Year	Two Way AADT		
	1.1km N of HWY 22 &567	E of 22 N of Cochrane	W of 766 NE of Cochrane
1997	3770	1810	1660
1998	3990	1910	1750
1999	4150	1980	1980
2000	4130	2130	2120
2001	4210	2170	2170
2002	4200	2170	2170
2003	4270	2200	2280
2004	4360	2390	2320
2005	4500	2590	2410
2006	4690	2720	2520
2007	4800	2810	2600
2008	4810	2830	3000
2009	4880	4440	3000
2010	4760	4440	3000
2011	4610	4320	3000
2012	4700	4380	3040
2013	4710	4420	3760
Growth rate (1997-2013)	1.56%	9.01%	7.91%
10 year GF	1.03%	10.09%	**4.01%**
5 year GF	-0.42%	11.24%	3.38%

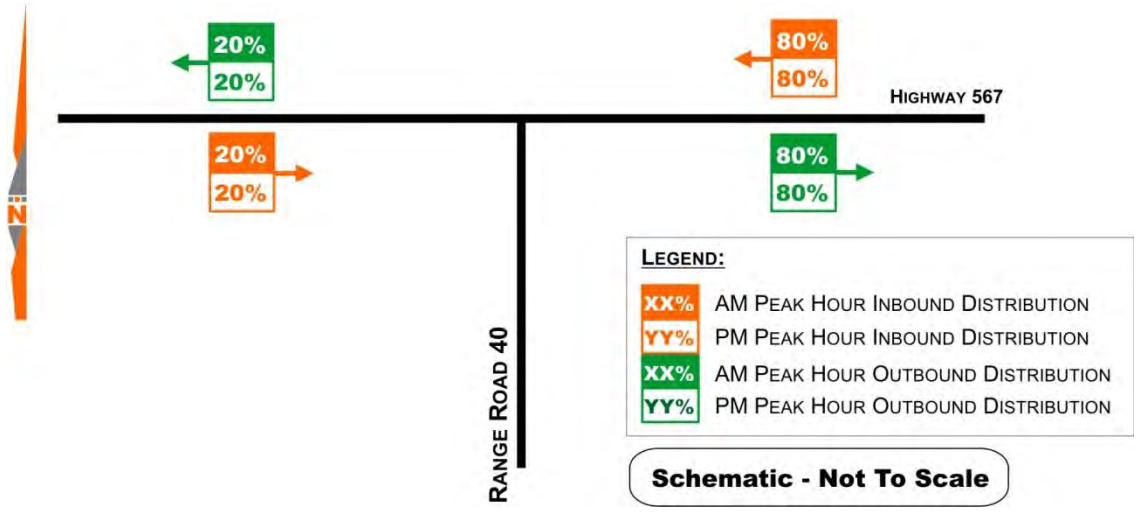


Figure 4: Trip Distribution

3.4 Post Development 10 Year Horizon Traffic Volumes

Applying the growth rate to the opening day volumes and adding the site generated traffic yielded the traffic volumes illustrated in **Figure 5**. It should be noted that all traffic entering and exiting the proposed development was assumed to be trucks.

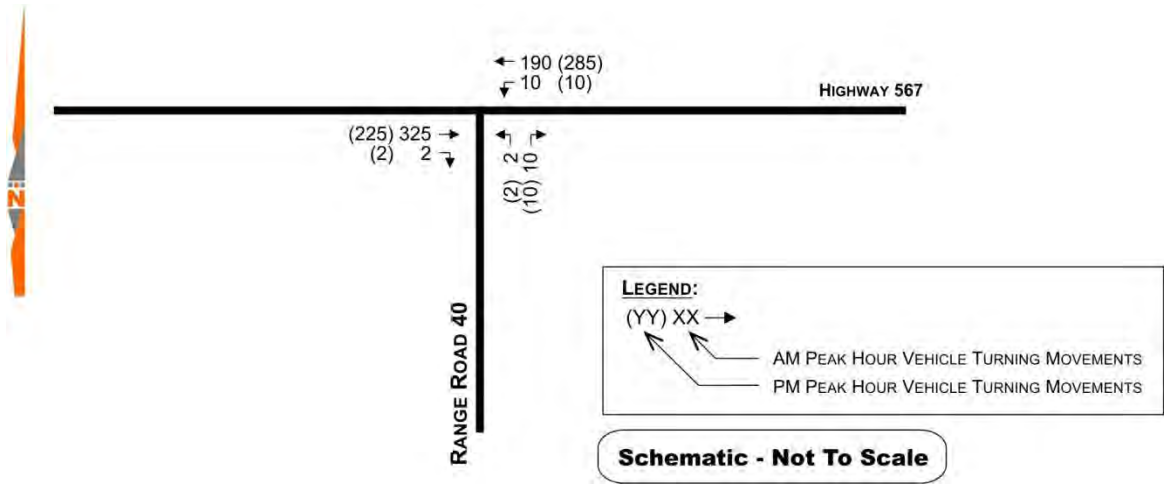


Figure 5: Post Development 10 Year Horizon Traffic Volumes

3.5 Post Development 10 Year Horizon Operating Conditions

The a.m. and p.m. peak hour traffic conditions for the 10 Year Horizon scenario were assessed in Synchro using the lane configurations and traffic controls shown in **Figure 2** and the traffic volumes shown in **Figure 5**. The results are shown in **Table 4** and full Synchro outputs are attached in **Appendix C**.

Table 4: 10 Year Horizon Operating Conditions

INTERSECTION / MOVEMENT			AM PEAK HOUR				PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 567 / Range Road 40 (Unsignalized)	EB	Right/Through	0.21	A	0.0	0.0	0.15	A	0.0	0.0
	WB	Left/Through	0.01	A	0.6	0.3	0.01	A	0.4	0.3
	NB	Left/Right	0.03	B	12.9	0.7	0.03	B	12.0	0.6

Table 4 shows that all movements operate at a LOS B or better with all v/c ratios below the 0.90 threshold.

4.0 POST DEVELOPMENT 20 YEAR HORIZON

4.1 Post Development 20 Year Horizon Traffic Volumes

The same growth rate was used for the 20 year analysis horizon as was used for the 10 year analysis horizon (4%). As noted previously, the growth rate was only applied to the through volumes on Highway 567 and not the turning movements into and out of the proposed development. The resulting traffic volumes are illustrated in **Figure 6**.

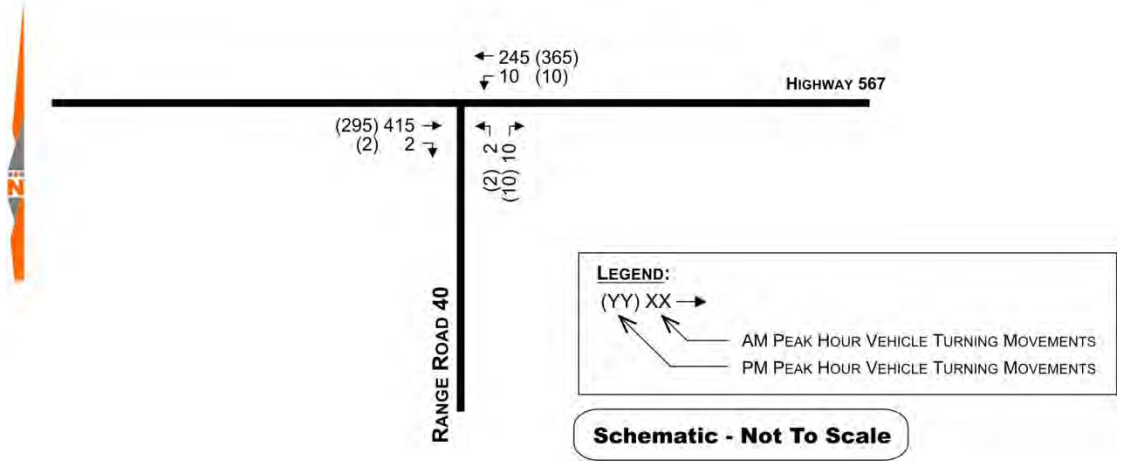


Figure 6: 20 Year Horizon Traffic Volumes

4.2 Post Development 20 Year Horizon Operating Conditions

The a.m. and p.m. peak hour traffic conditions for the 20 Year Horizon scenario were assessed in Synchro using the lane configurations and traffic controls shown in **Figure 2** and the traffic volumes shown in **Figure 6**. The results are shown in **Table 5** and full Synchro outputs are attached in **Appendix C**.

Table 5: 20 Year Horizon Operating Conditions

INTERSECTION / MOVEMENT			AM PEAK HOUR				PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 567 / Range Road 40 (Unsignalized)	EB	Right/Through	0.27	A	0.0	0.0	0.19	A	0.0	0.0
	WB	Left/Through	0.02	A	0.6	0.4	0.01	A	0.4	0.3
	NB	Left/Right	0.03	B	14.4	0.8	0.03	B	13.1	0.7

Table 5 shows that all movements operate at a LOS B or better with all v/c ratios below the 0.90 threshold.

5.0 PROPOSED INTERSECTION CONFIGURATION

All analyzed scenarios meet the LOS and v/c ratio requirements given by AT, however due to the type of traffic entering and exiting the site additional requirements need to be evaluated.

100% of the site traffic is expected to be heavy vehicles. The heavy vehicles leaving the site will be transporting large amounts of gravel, making them even heavier. Acceleration and deceleration for these trucks will require more time and space than would be required for passenger cars. Because of this, warrants for exclusive right turn lanes and left turn lanes needed to be analyzed. These geometric conditions were assessed using Alberta Infrastructure's Highway Geometric Design Guide.[2]

5.1 Left Turn Warrant

The left turn warrant procedure in the Highway Geometric Design Guide was followed for each scenario. The p.m. peak hour volumes were used in the analysis due to the higher estimated volumes. The results are shown in **Figure 7**.

[2] Alberta Infrastructure. Highway Geometric Design Guide 1995 Updated 1999.

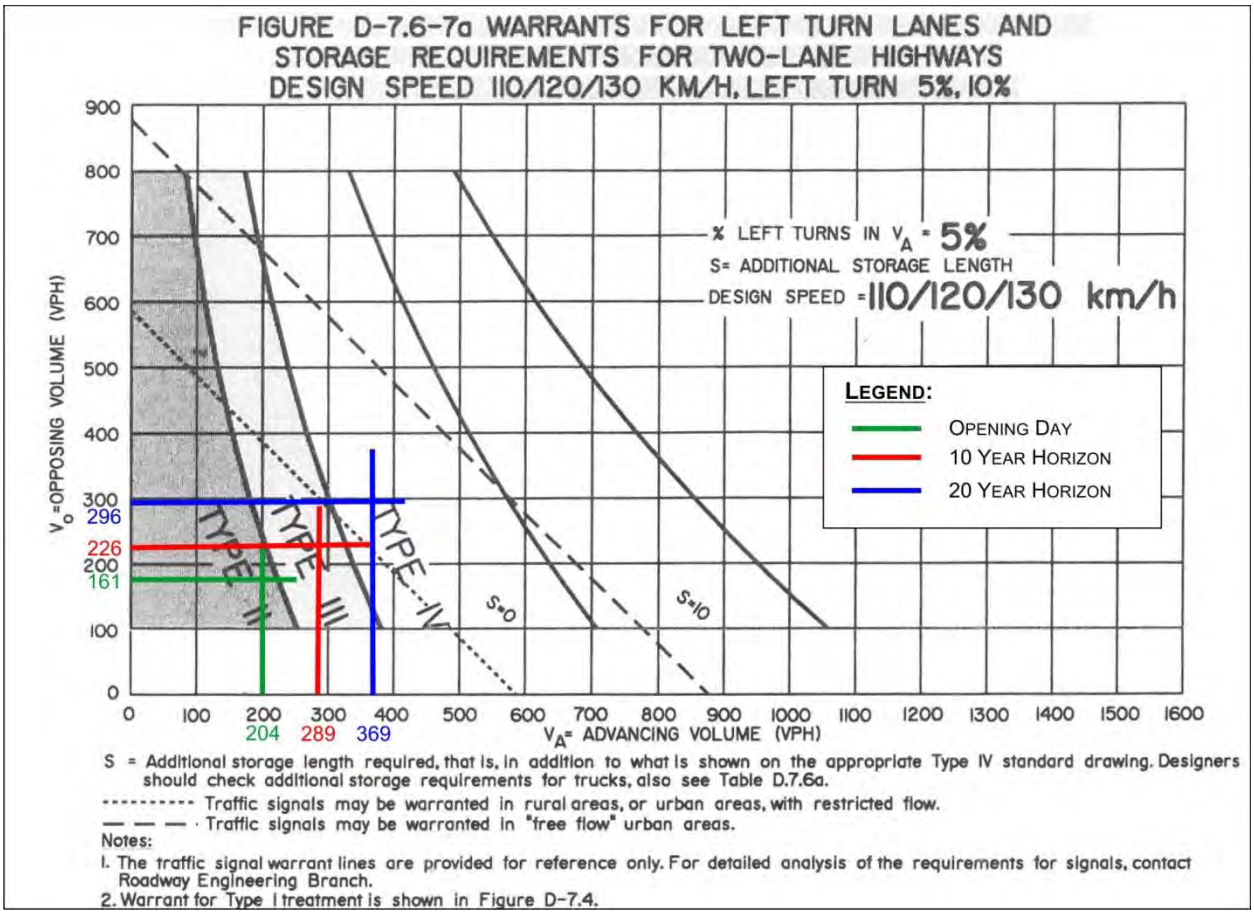


Figure 7: Left Turn Warrant

The results illustrated in **Figure 7** indicate the following:

- a Type II intersection is required for Opening Day conditions,
- a Type III intersection is required for the 10 Year Horizon Conditions, and
- a Type IV intersection is required for the 20 Year Horizon Conditions.

Type II, Type III, and Type IV intersection treatments are illustrated, as per the Highway Geometric Design Guide, in **Appendix D**.

5.2 Right Turn Warrant

Three conditions must be met in order for an exclusive right turn to be warranted at a two-lane highway intersection:

1. Main (or through) road AADT should be equal to or greater than 1800
2. Intersecting road AADT should be equal to or greater than 900, and

3. Right turn daily traffic volume should be equal to or greater than 360 for the analyzed movement

For all scenarios the AADT on the Private Access Road (intersecting road) is less than 900 vehicles. Also, for all scenarios the daily traffic volume for the eastbound right turn movement into the development is less than 360. Therefore an exclusive right turn lane is not warranted for any of the analyzed scenarios.

5.3 Warrant Summary

Table 6 summarizes the geometric modifications required at the intersection of Highway 567 and the Gravel Pit Access for each scenario.

Table 6: Warrant Summary

Scenario	Warrant	
	Left Turn Warrant	Right Turn Warrant
Opening Day	Type II Intersection Warranted - no exlusive left turn lane see Figure E1 in Appendix E for details	Right turn not warranted
10 Year Horizon	Type III Intersection Warranted - no exlusive left turn lane see Figure E2 in Appendix E for details	Right turn not warranted
20 Year Horizon	Type IV Intersection Warranted - exlusive left turn lane warranted see Figure E3 in Appendix E for details	Right turn not warranted

Due to modifications in geometric conditions being warranted, each scenario was evaluated once again in Synchro with the required geometric modifications implemented. **Table 7** summarizes the results for the Opening Day Scenario.

Table 7: Opening Day Conditions – Improved Geometry

INTERSECTION / MOVEMENT			AM PEAK HOUR				PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 567 / Range Road 40 (Unsignalized)	EB	Through	0.15	A	0.0	0.0	0.10	A	0.0	0.0
		Through/Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
	WB	Left	0.01	A	9.1	0.3	0.01	A	8.7	0.3
		Through	0.09	A	0.0	0.0	0.13	A	0.0	0.0
	NB	Left/Right	0.02	B	11.6	0.6	0.02	B	11.0	0.5

As shown in **Table 7**, all intersection approaches operate at LOS B or better, and all v/c ratios are below the 0.90 threshold.

Table 8 summarizes the results for the 10 Year Horizon Scenario with the required improved geometry.

Table 8: 10 Year Horizon Conditions – Improved Geometry

INTERSECTION / MOVEMENT			AM PEAK HOUR				PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 567 / Range Road 40 (Unsignalized)	EB	Through	0.21	A	0.0	0.0	0.15	A	0.0	0.0
		Through/Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
	WB	Left	0.01	A	9.5	0.3	0.01	A	9.0	0.3
		Through	0.12	A	0.0	0.0	0.19	A	0.0	0.0
	NB	Left/Right	0.03	B	12.9	0.7	0.03	B	12.0	0.6

As shown in **Table 8**, all intersection approaches operate at LOS B or better, and all v/c ratios are below the 0.90 threshold.

Table 9 summarizes the results for the 20 Year Horizon Scenario with the required improved geometry.

Table 9: 20 Year Horizon Conditions – Improved Geometry

INTERSECTION / MOVEMENT			AM PEAK HOUR				PM PEAK HOUR			
			v/c Ratio	LOS	Delay (s)	Queue (m)	v/c Ratio	LOS	Delay (s)	Queue (m)
Highway 567 / Range Road 40 (Unsignalized)	EB	Through	0.27	A	0.0	0.0	0.19	A	0.0	0.0
		Through/Right	0.00	A	0.0	0.0	0.00	A	0.0	0.0
	WB	Left	0.02	A	10.0	0.4	0.01	A	9.4	0.3
		Through	0.16	A	0.0	0.0	0.24	A	0.0	0.0
	NB	Left/Right	0.03	B	14.5	0.8	0.03	B	13.1	0.7

As shown in **Table 9**, all intersection approaches operate at LOS B or better, and all v/c ratios are below the 0.90 threshold.

6.0 SITE DISTANCE

A site visit was conducted on August 7, 2014. From this site visit it was estimated that the grade of Highway 567 within the area of the proposed development is approximately 0%. Also confirmed was that there are no trees or buildings blocking the drivers' view of Highway 567. According to Figure D-4.2.2.2 in AI's Highway Geometric Design Guide, a maximum site distance of 560m is required for heavy vehicles turning left onto a highway with a 0% grade and a design speed of 110km/hr. This is illustrated in **Figure 8**.

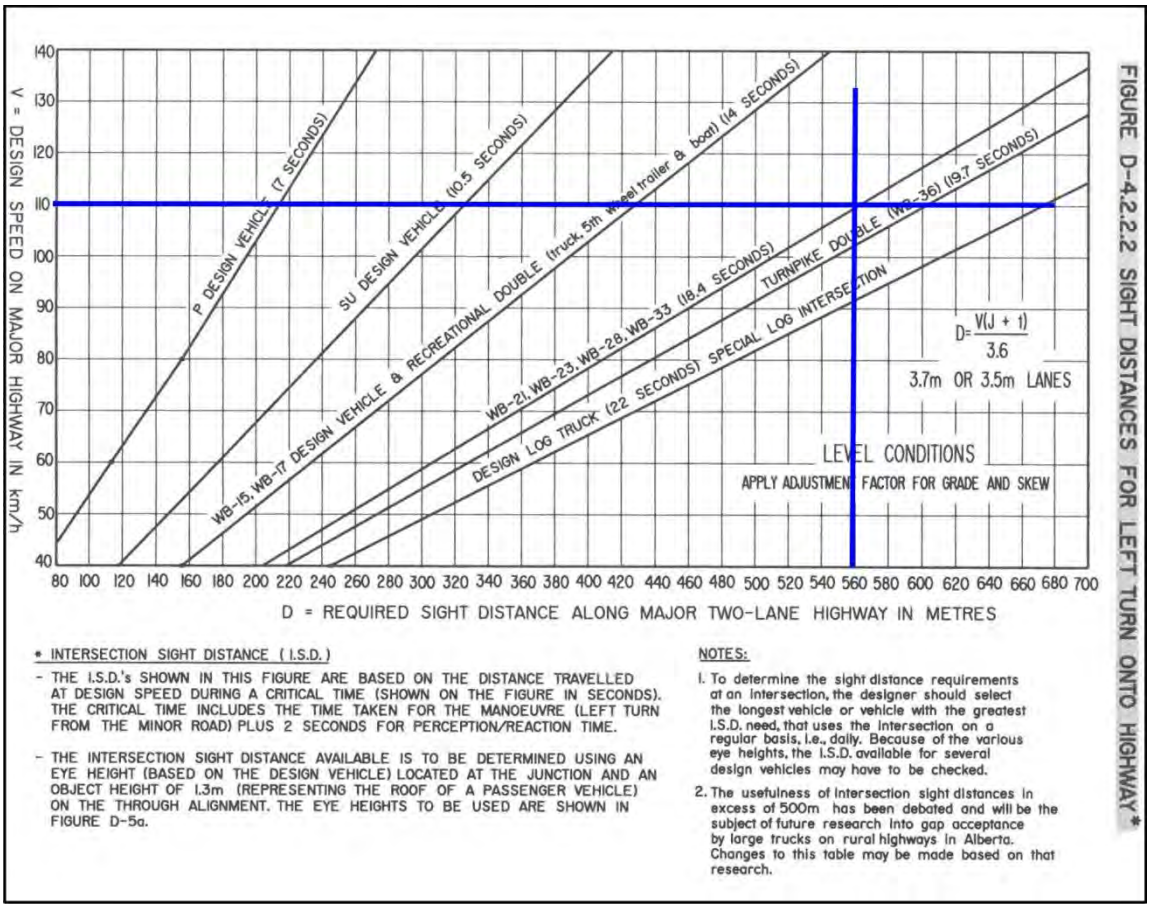


Figure 8: Sight Distance for Left Turn onto Highway

Photographs of the site distance looking both west and east were taken and are shown in **Figure 9** and **Figure 10**.

Figure 9: Site Distance Looking East

Figure 10: Site Distance Looking West

With the estimated 0% grade on Highway 567 and no trees or buildings within the area, a sight distance greater than 560m is provided for trucks leaving the site, travelling west. A similar sight distance is provided looking east. Because the sight distance required for stopped vehicles turning right onto a highway is less than for vehicles turning left (attributed to the turning vehicle crossing less travel lanes), sight distance for trucks leaving the proposed development turning right was not analyzed and was assumed to be sufficient.

7.0 CONCLUSIONS

Although all intersection approaches at the intersection of Highway 567 & Range Road 40 meet AT's operational requirements of LOS D or better and v/c below 0.90 with simple improvements (paved, two lane, undivided Range Road 40 with stop sign), further improvements are required to accommodate the high percentage of heavy vehicle traffic entering and exiting the site.

To meet all requirements the Opening Day Scenario requires a Type IIa intersection treatment, the 10 Year Horizon Scenario requires a Type IIIa intersection treatment, and the 20 Year Horizon Scenario requires a Type IVa intersection treatment.

The implementation of a Type IVa intersection upon opening of the proposed development would be ideal. However, this may not be desirable because a Type IVa intersection is not estimated to be required until after 10 years of operation of the Gravel Pit (more than half the life expectancy of the Gravel Pit). As the Type IVa intersection is not required upon opening of the Gravel Pit, it is recommended that a Type IIIa intersection be introduced immediately to address safety of the operation (acceleration/deceleration) of the heavy vehicles entering and exiting the site. A traffic monitoring program should be initiated in conjunction with the Type IIIa intersection to monitor the traffic growth in the area to establish if and when upgrades to the intersection will be required.

APPENDIX A: AT TRAFFIC COUNTS

Turning Movement Summary Diagram

Reference No.: 66220

Intersection of:
567 & 766 NE OF COCHRANE

2012 AADT / ASDT ESTIMATES

North On 766		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	926	90.8
B: Recreational Vehicle	4	0.4
S: Bus	11	1.1
D: Single Unit Truck	48	4.7
E: Tractor Trailer Unit	31	3.0
ASDT 1220	**AADT** 1020	

West On 567		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2624	86.3
B: Recreational Vehicle	73	2.4
S: Bus	18	0.6
D: Single Unit Truck	106	3.5
E: Tractor Trailer Unit	219	7.2
ASDT 3650	**AADT** 3040	

East On 567		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	2457	85.3
B: Recreational Vehicle	71	2.5
S: Bus	14	0.5
D: Single Unit Truck	118	4.1
E: Tractor Trailer Unit	220	7.6
ASDT 3460	**AADT** 2880	

South On 766		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	1583	93.1
B: Recreational Vehicle	10	0.6
S: Bus	9	0.5
D: Single Unit Truck	68	4.0
E: Tractor Trailer Unit	30	1.8
ASDT 1860	**AADT** 1700	

TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

TURNING MOVEMENT ABBREVIATIONS

AADT: Average Annual Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of January 1 to December 31 (365 days)

ASDT: Average Summer Daily Traffic
Average daily traffic expressed as vehicles per day fo
period of May 1 to September 30 (153 days)

Turning Movement Summary Diagram

Reference No.: 66220

Intersection of:
567 & 766 NE OF COCHRANE

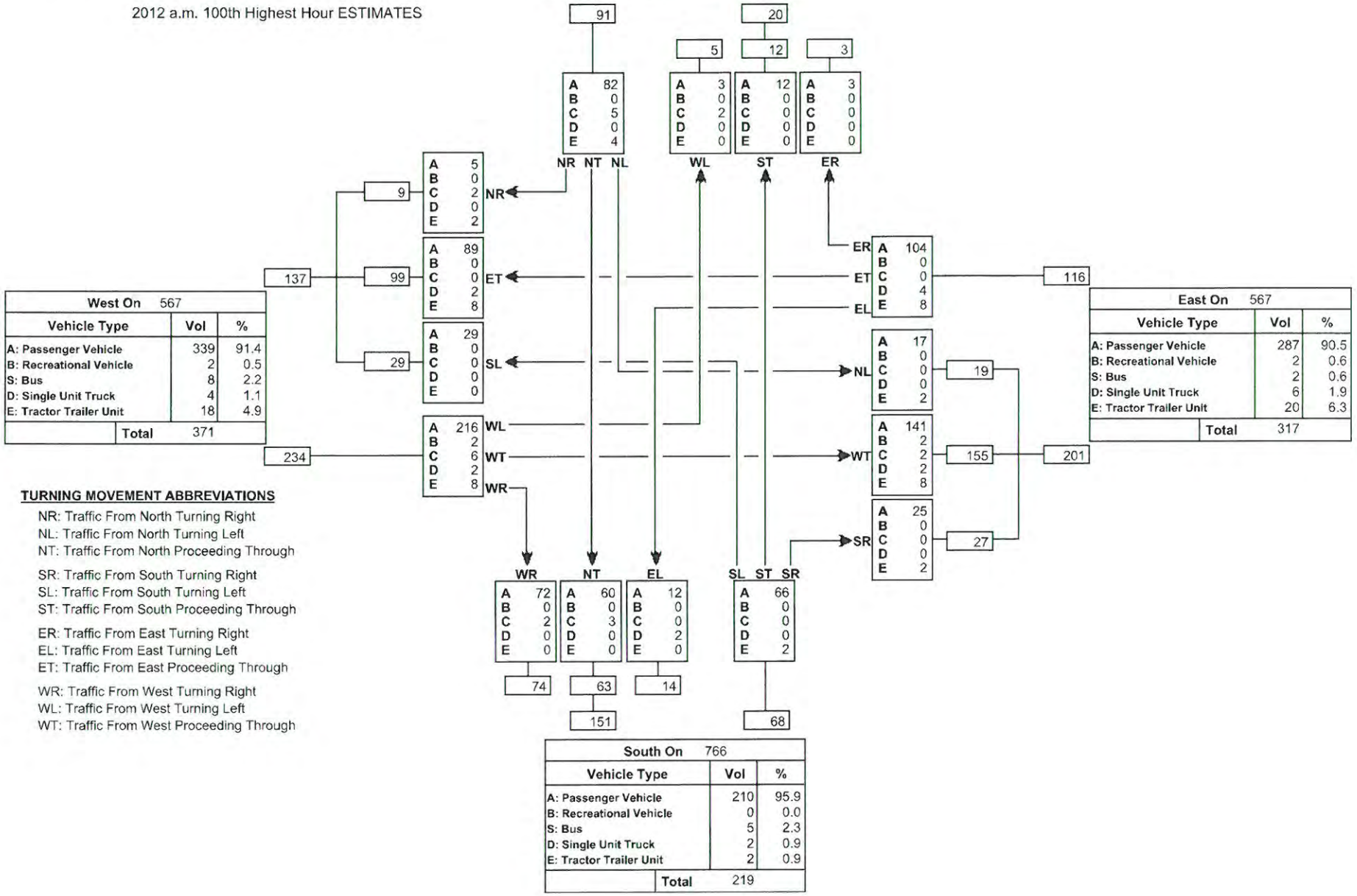
2012 a.m. 100th Highest Hour ESTIMATES

North On 766		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	100	90.1
B: Recreational Vehicle	0	0.0
S: Bus	7	6.3
D: Single Unit Truck	0	0.0
E: Tractor Trailer Unit	4	3.6
Total	111	

West On 567		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	339	91.4
B: Recreational Vehicle	2	0.5
S: Bus	8	2.2
D: Single Unit Truck	4	1.1
E: Tractor Trailer Unit	18	4.9
Total	371	

East On 567		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	287	90.5
B: Recreational Vehicle	2	0.6
S: Bus	2	0.6
D: Single Unit Truck	6	1.9
E: Tractor Trailer Unit	20	6.3
Total	317	

South On 766		
Vehicle Type	**Vol**	**%**
A: Passenger Vehicle	210	95.9
B: Recreational Vehicle	0	0.0
S: Bus	5	2.3
D: Single Unit Truck	2	0.9
E: Tractor Trailer Unit	2	0.9
Total	219	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

Turning Movement Summary Diagram

Reference No.: 66220

Intersection of:
567 & 766 NE OF COCHRANE

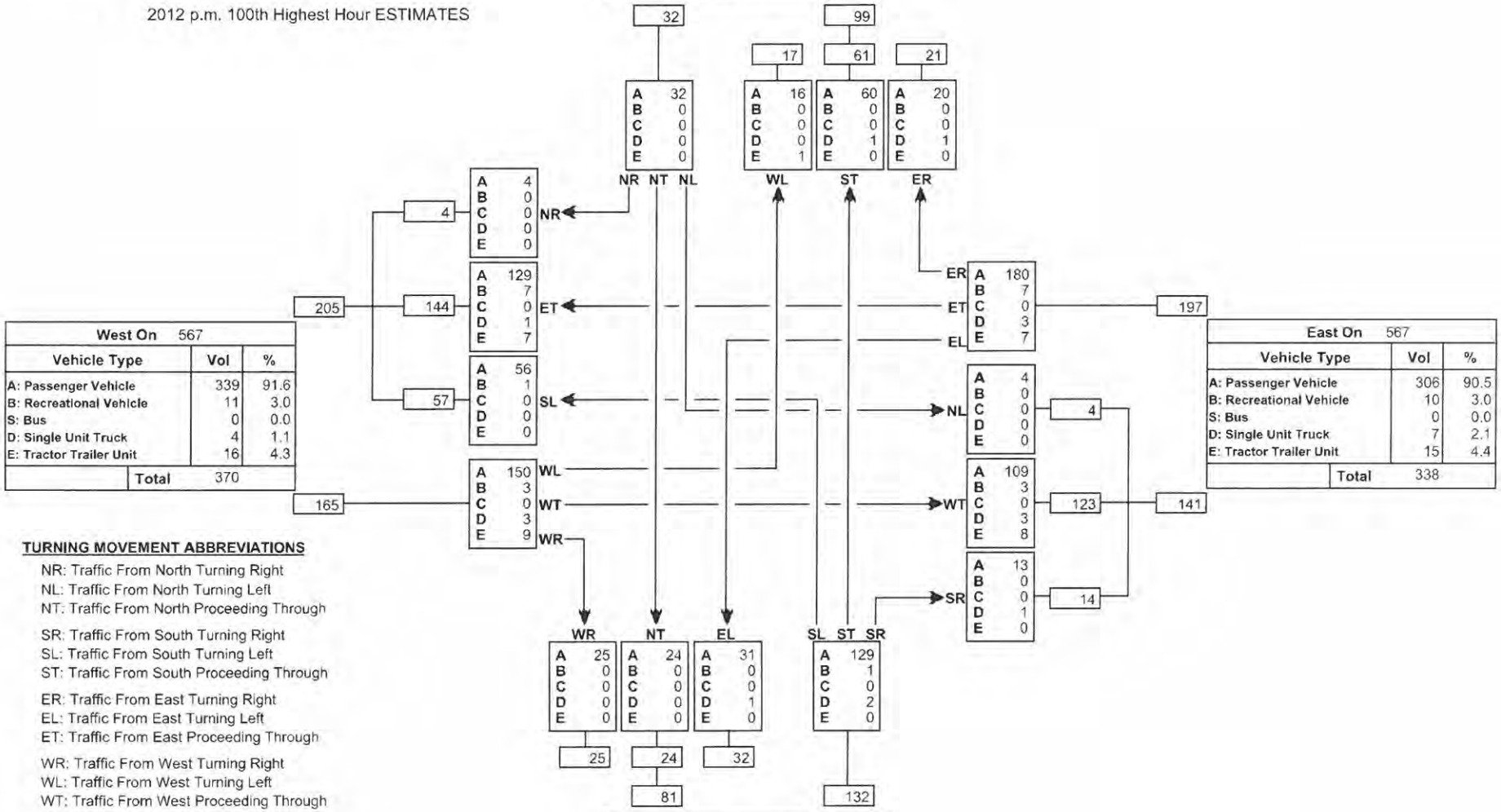
2012 p.m. 100th Highest Hour ESTIMATES

North On 766		
Vehicle Type	Vol	%
A: Passenger Vehicle	128	97.7
B: Recreational Vehicle	0	0.0
S: Bus	0	0.0
D: Single Unit Truck	2	1.5
E: Tractor Trailer Unit	1	0.8
Total	131	

West On 567		
Vehicle Type	Vol	%
A: Passenger Vehicle	339	91.6
B: Recreational Vehicle	11	3.0
S: Bus	0	0.0
D: Single Unit Truck	4	1.1
E: Tractor Trailer Unit	16	4.3
Total	370	

East On 567		
Vehicle Type	Vol	%
A: Passenger Vehicle	306	90.5
B: Recreational Vehicle	10	3.0
S: Bus	0	0.0
D: Single Unit Truck	7	2.1
E: Tractor Trailer Unit	15	4.4
Total	338	

South On 766		
Vehicle Type	Vol	%
A: Passenger Vehicle	209	98.1
B: Recreational Vehicle	1	0.5
S: Bus	0	0.0
D: Single Unit Truck	3	1.4
E: Tractor Trailer Unit	0	0.0
Total	213	



TURNING MOVEMENT ABBREVIATIONS

NR: Traffic From North Turning Right
NL: Traffic From North Turning Left
NT: Traffic From North Proceeding Through

SR: Traffic From South Turning Right
SL: Traffic From South Turning Left
ST: Traffic From South Proceeding Through

ER: Traffic From East Turning Right
EL: Traffic From East Turning Left
ET: Traffic From East Proceeding Through

WR: Traffic From West Turning Right
WL: Traffic From West Turning Left
WT: Traffic From West Proceeding Through

APPENDIX B: CORRESPONDENCE WITH SUMMIT AGGREGATES LTD.

Kayla Royce

From: Kayla Royce
Sent: August-18-14 2:36 PM
To: Kayla Royce
Subject: FW: Draft TIA

WATT Consulting Group
Kayla Royce, B.Sc., E.I.T. Transportation Engineer
T 403.273.9001 ext 272
www.wattconsultinggroup.com

From: Tige Brady [mailto:tige.brady@telus.net]
Sent: August-11-14 10:19 AM
To: Tomasz Kroman
Cc: 'Kim Wolkowski'; 'Mitch Schaufler'
Subject: RE: Draft TIA

Tomasz,

My comments are as follows:

- Change title page to read, "Proposed Aggregate Extraction and Development"
- Prepared for: Summit Aggregates Ltd.
- There is no private access road. The proposed access road is via a county Right of Way which is Range Road 40.
- Please refer to the operator as Summit Aggregates Ltd. in all instances in the report. Summit is the legal corporation that will be applying for the permits and will be operating the site when all approvals are in place.
- Change the trip generation estimation to 9 trucks per hour or approximately 4320 tonnes per day using a 40 tonne average load. This would be peak production. Proposed hours of operation, 7 to 7 Monday through Friday; 7 to 5 on Saturdays and no hauling activity on Sundays or statutory holidays. Volume and distribution will most likely increase over the 10 and 20 year horizons. Opening day trip generation is estimated at 5 trucks per hour or 2400 tonnes per day assuming an average 40 tonne load and 12 hours per day of hauling activity.
- Could the access road to the east which provides access to the house on that quarter be considered as potential access instead of Range Road 40? Please provide commentary and your opinion and related treatments with respect to this option if at all possible?

If you have any questions or concerns, please contact me.

From: Tomasz Kroman [mailto:TKroman@wattconsultinggroup.com]
Sent: August 8, 2014 11:21 AM
To: Tige Brady (tige.brady@telus.net)
Cc: Kayla Royce
Subject: Draft TIA

Tige;

Attached for your review and comments is a PDF file containing TIA Report. Once we receive your comments we will prepare final copy for submission to AT and RVC. Please note that technical appendixes have not been included to reduce file size.
Regards

Tomasz Kroman, M.Sc., P.Eng
Senior Consultant

P 403.273.9001 ext 721
D 403.569.8721
C 403.608.1696
E TKroman@wattconsultinggroup.com

#310, 3016 - 5 Avenue NE
Calgary, Alberta T2A 6K4

APPENDIX C: SYNCHRO OUTPUTS

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	230	2	10	135	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	256	2	11	150	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			258		429	257
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			258		429	257
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			899		430	594

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	258	161	13
Volume Left	0	11	2
Volume Right	2	0	11
cSH	1700	899	558
Volume to Capacity	0.15	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.6
Control Delay (s)	0.0	0.7	11.6
Lane LOS		A	B
Approach Delay (s)	0.0	0.7	11.6
Approach LOS			B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		25.3%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	160	2	10	200	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	178	2	11	222	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			180		423	179
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			180		423	179
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			971		434	664

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	180	233	13
Volume Left	0	11	2
Volume Right	2	0	11
cSH	1700	971	610
Volume to Capacity	0.11	0.01	0.02
Queue Length 95th (m)	0.0	0.3	0.5
Control Delay (s)	0.0	0.5	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.5	11.0
Approach LOS			B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		28.7%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	325	2	10	190	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	361	2	11	211	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			363		596	362
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			363		596	362
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			808		334	509

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	363	222	13
Volume Left	0	11	2
Volume Right	2	0	11
cSH	1700	808	468
Volume to Capacity	0.21	0.01	0.03
Queue Length 95th (m)	0.0	0.3	0.7
Control Delay (s)	0.0	0.6	12.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.6	12.9
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		28.2%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	225	2	10	285	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	250	2	11	317	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			252		590	251
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			252		590	251
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			904		337	598

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	252	328	13
Volume Left	0	11	2
Volume Right	2	0	11
cSH	1700	904	530
Volume to Capacity	0.15	0.01	0.03
Queue Length 95th (m)	0.0	0.3	0.6
Control Delay (s)	0.0	0.4	12.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	12.0
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		33.1%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	415	2	10	245	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	461	2	11	272	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			463		757	462
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			463		757	462
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			98		99	97
cM capacity (veh/h)			731		261	440

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	463	283	13
Volume Left	0	11	2
Volume Right	2	0	11
cSH	1700	731	395
Volume to Capacity	0.27	0.02	0.03
Queue Length 95th (m)	0.0	0.4	0.8
Control Delay (s)	0.0	0.6	14.4
Lane LOS		A	B
Approach Delay (s)	0.0	0.6	14.4
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		32.0%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	295	2	10	365	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	328	2	11	406	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			330		757	329
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			330		757	329
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			836		261	535

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	330	417	13
Volume Left	0	11	2
Volume Right	2	0	11
cSH	1700	836	455
Volume to Capacity	0.19	0.01	0.03
Queue Length 95th (m)	0.0	0.3	0.7
Control Delay (s)	0.0	0.4	13.1
Lane LOS		A	B
Approach Delay (s)	0.0	0.4	13.1
Approach LOS			B

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		37.3%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	230	2	10	135	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	256	2	11	150	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			258		428	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			258		428	256
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			899		431	595

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	256	2	11	150	13
Volume Left	0	0	11	0	2
Volume Right	0	2	0	0	11
cSH	1700	1700	899	1700	559
Volume to Capacity	0.15	0.00	0.01	0.09	0.02
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.6
Control Delay (s)	0.0	0.0	9.1	0.0	11.6
Lane LOS			A		B
Approach Delay (s)	0.0		0.6		11.6
Approach LOS					B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	160	2	10	200	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	178	2	11	222	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			180		422	178
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			180		422	178
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			971		435	665

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	178	2	11	222	13
Volume Left	0	0	11	0	2
Volume Right	0	2	0	0	11
cSH	1700	1700	971	1700	611
Volume to Capacity	0.10	0.00	0.01	0.13	0.02
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.5
Control Delay (s)	0.0	0.0	8.7	0.0	11.0
Lane LOS			A		B
Approach Delay (s)	0.0		0.4		11.0
Approach LOS					B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	325	2	10	190	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	361	2	11	211	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			363		594	361
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			363		594	361
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			808		335	510

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	361	2	11	211	13
Volume Left	0	0	11	0	2
Volume Right	0	2	0	0	11
cSH	1700	1700	808	1700	469
Volume to Capacity	0.21	0.00	0.01	0.12	0.03
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.7
Control Delay (s)	0.0	0.0	9.5	0.0	12.9
Lane LOS			A		B
Approach Delay (s)	0.0		0.5		12.9
Approach LOS					B

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	225	2	10	285	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	250	2	11	317	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			252		589	250
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			252		589	250
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			904		338	599

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	250	2	11	317	13
Volume Left	0	0	11	0	2
Volume Right	0	2	0	0	11
cSH	1700	1700	904	1700	531
Volume to Capacity	0.15	0.00	0.01	0.19	0.03
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.6
Control Delay (s)	0.0	0.0	9.0	0.0	12.0
Lane LOS			A		B
Approach Delay (s)	0.0		0.3		12.0
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	418	2	10	243	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	464	2	11	270	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			467		757	464
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			467		757	464
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			98		99	97
cM capacity (veh/h)			728		261	439

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	464	2	11	270	13
Volume Left	0	0	11	0	2
Volume Right	0	2	0	0	11
cSH	1700	1700	728	1700	394
Volume to Capacity	0.27	0.00	0.02	0.16	0.03
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.8
Control Delay (s)	0.0	0.0	10.0	0.0	14.5
Lane LOS			B		B
Approach Delay (s)	0.0		0.4		14.5
Approach LOS					B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	293	2	10	365	2	10
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	326	2	11	406	2	11
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			328		753	326
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			328		753	326
tC, single (s)			5.1		7.4	7.2
tC, 2 stage (s)						
tF (s)			3.1		4.4	4.2
p0 queue free %			99		99	98
cM capacity (veh/h)			838		263	537

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	326	2	11	406	13
Volume Left	0	0	11	0	2
Volume Right	0	2	0	0	11
cSH	1700	1700	838	1700	457
Volume to Capacity	0.19	0.00	0.01	0.24	0.03
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.7
Control Delay (s)	0.0	0.0	9.4	0.0	13.1
Lane LOS			A		B
Approach Delay (s)	0.0		0.2		13.1
Approach LOS					B

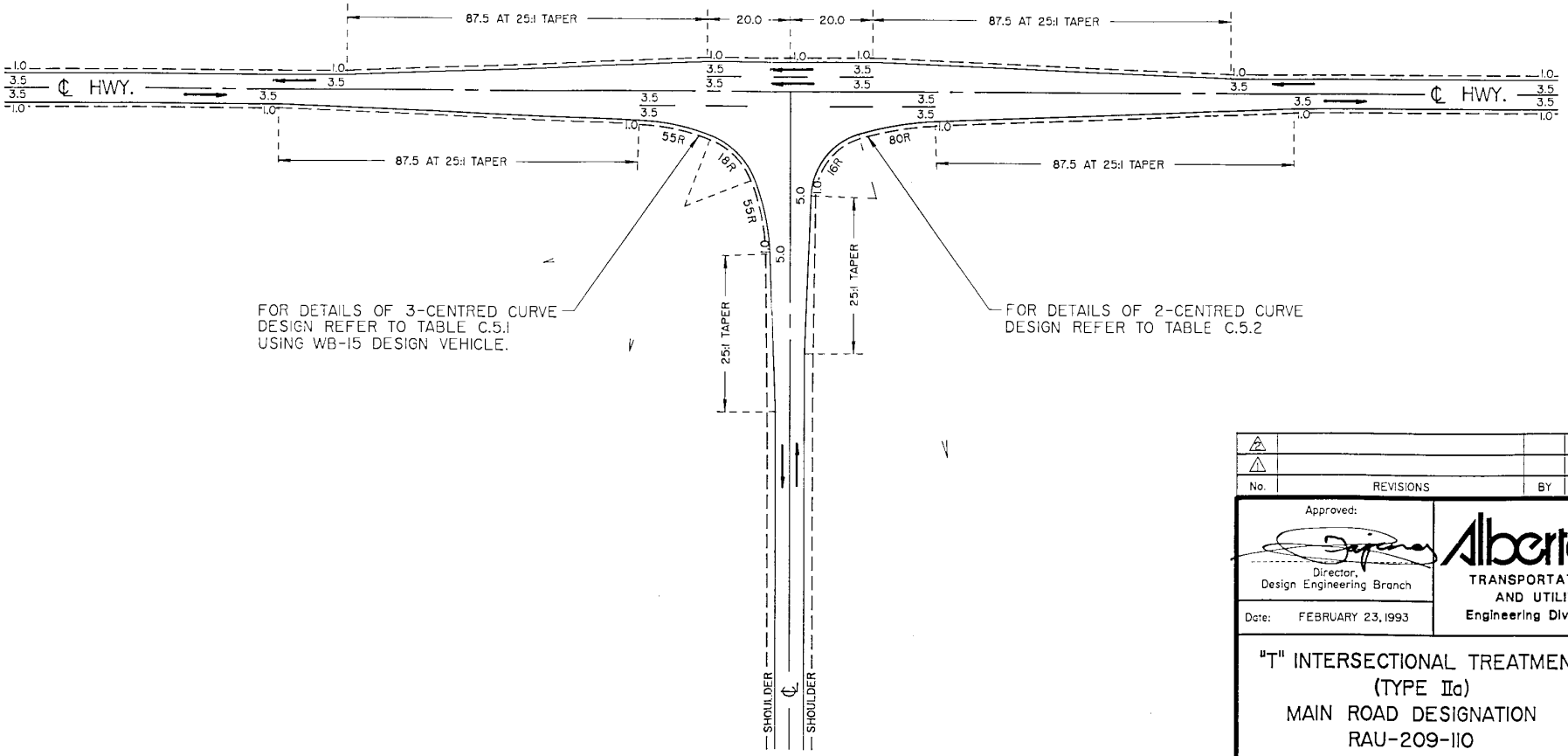
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX D: ALBERTA INFRASTRUCTURE - HIGHWAY GEOMETRIC DESIGN GUIDE INTERSECTION TREATMENTS

"T" INTERSECTIONAL TREATMENT (TYPE IIa)

(TWO-LANE HIGHWAY)

NOTES: DIMENSIONS SHOWN ARE FINISHED SURFACE PAVEMENT WIDTHS. ADDITIONAL SUBGRADE WIDTHS TO BE PROVIDED TO ALLOW FOR DEPTH OF BASE COURSE AND PAVEMENT.



No.	REVISIONS	BY	DATE
2			
1			

Approved:

Director,
Design Engineering Branch

Date: FEBRUARY 23, 1993

Alberta
TRANSPORTATION AND UTILITIES
Engineering Division

"T" INTERSECTIONAL TREATMENT
(TYPE IIa)
MAIN ROAD DESIGNATION
RAU-209-110

Prepared By: R.T.	Checked By: B.K.	Scale: N.T.S.	Dwg No.: CB6-2.3C24D

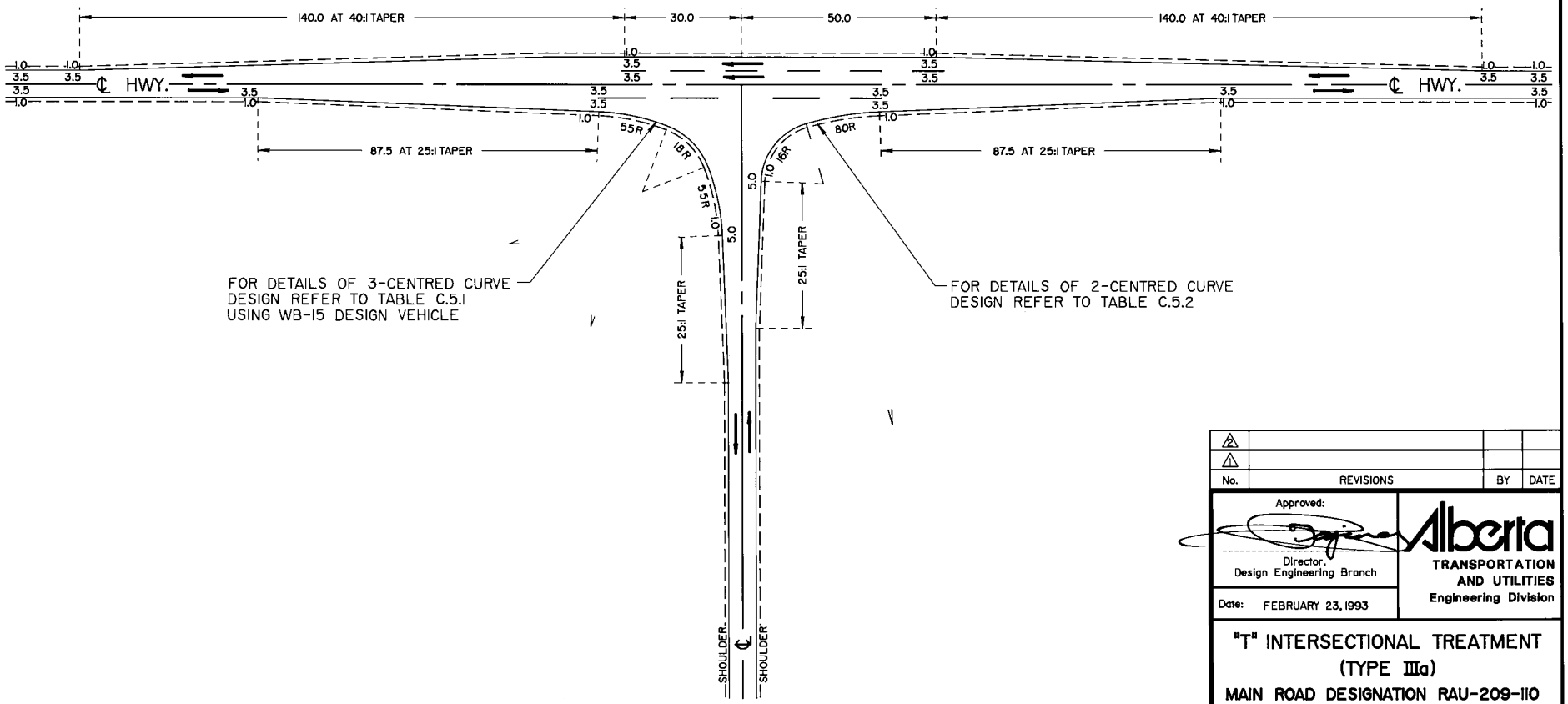
cb6\cb623m62.

Figure E1

"T" INTERSECTIONAL TREATMENT (TYPE IIIa)

(TWO-LANE HIGHWAY)

NOTES: DIMENSIONS SHOWN ARE FINISHED SURFACE PAVEMENT WIDTHS.
ADDITIONAL SUBGRADE WIDTHS TO BE PROVIDED TO ALLOW
FOR DEPTH OF BASE COURSE AND PAVEMENT.



No.	REVISIONS	BY	DATE
2			
1			

Approved:

Director,
Design Engineering Branch

Date: FEBRUARY 23, 1993

Alberta
TRANSPORTATION
AND UTILITIES
Engineering Division

"T" INTERSECTIONAL TREATMENT
(TYPE IIIa)
MAIN ROAD DESIGNATION RAU-209-110

Prepared By: Cgk	Checked By: B.K.	Scale: N.T.S.	Dwg No.: CB6-2.3C27D

GRAPHICS FILE: \debcb6\cb623m65.

Figure E2

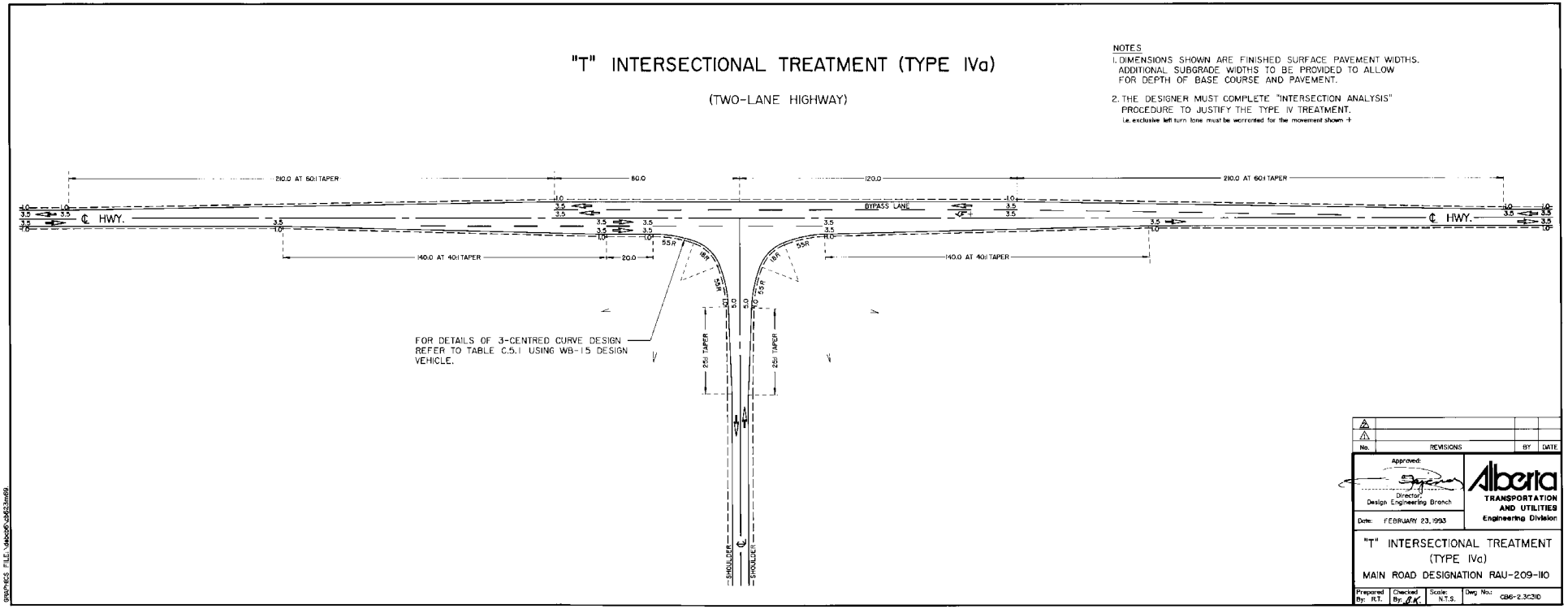

"T" INTERSECTIONAL TREATMENT (TYPE IVa)
(TWO-LANE HIGHWAY)
NOTES
1. DIMENSIONS SHOWN ARE FINISHED SURFACE PAVEMENT WIDTHS. ADDITIONAL SUBGRADE WIDTHS TO BE PROVIDED TO ALLOW FOR DEPTH OF BASE COURSE AND PAVEMENT.
2. THE DESIGNER MUST COMPLETE "INTERSECTION ANALYSIS" PROCEDURE TO JUSTIFY THE TYPE IV TREATMENT.
i.e. exclusive left turn lane must be warranted for the movement shown +
210.0 AT 60:1 TAPER
80.0
120.0
210.0 AT 60:1 TAPER
℄ HWY.
BYPASS LANE
℄ HWY.
140.0 AT 40:1 TAPER
20.0
140.0 AT 40:1 TAPER
55 R
18 R
FOR DETAILS OF 3-CENTRED CURVE DESIGN REFER TO TABLE C.5.1 USING WB-15 DESIGN VEHICLE.
25:1 TAPER
25:1 TAPER
SHOULDER
SHOULDER
No. REVISIONS BY DATE
Approved:
Director
Design Engineering Branch
Date: FEBRUARY 23, 1993
Alberta
TRANSPORTATION AND UTILITIES
Engineering Division
"T" INTERSECTIONAL TREATMENT
(TYPE IVa)
MAIN ROAD DESIGNATION RAU-209-110
Prepared By: R.T.
Checked By: B.K.
Scale: N.T.S.
Dwg No.: CB6-2.3C310
GRAPHICS FILE: \MACOR\CAD\23mm69

Figure E3

APPENDIX E: SCOPE CONFIRMATION

Kayla Royce

From: Kayla Royce
Sent: August-18-14 2:52 PM
To: Kayla Royce
Subject: scope confirmation

From: Tige Brady [mailto:tige.brady@telus.net]
Sent: July-29-14 8:32 AM
To: Tomasz Kroman
Cc: Mitch Schaufler; Kim Wolkowski
Subject: Re: PROPOSAL FOR PREPARATION OF THE TIA FOR THE PROPOSED GRAVEL PIT IN NW 31-26-3-W5M

Hi Tomasz,

Please proceed with TIA for the above.

Kim, Can you prepare a cheque for $2,000 and have it sent to DA WATT for retainer of their services? Please see below.

Regards,

Tige Brady, C.E.T.

Sent from my BlackBerry 10 smartphone on the Rogers network.

From: Tomasz Kroman
Sent: Thursday, July 17, 2014 9:47 AM
To: Tige Brady
Cc: Mitch Schaufler; Kim Wolkowski
Subject: PROPOSAL FOR PREPARATION OF THE TIA FOR THE PROPOSED GRAVEL PIT IN NW 31-26-3-W5M

Tige;

This proposal was prepared in response to your e-mail request dated July 16, 2014 to prepare a Traffic Impact Assessment (TIA) for the proposed gravel pit located in NW 31-26-3-W5M south of Highway 567 and east of Highway 22. This proposal was prepared based on discussion with Alberta Transportation (AT) as the access of the proposed pit will be off of Highway 567 via the existing private road west of the site.

Based on my discussion with Mr. Trevor Richelhof (AT) the TIA should address following aspects;

- Confirmation of the site distance at the Highway 567 access point,
- Traffic generation by the site,
- Analysis of the capacity and operational conditions at the access intersection on Highway 567 at;
    - Opening day of the operation,
    - 10 and 20 year horizon or if exploration of the gravel is foreseen to be shorter than 20 years at the pit closure time,
    - Identification of the improvements required at the access intersection to accommodate pit traffic.

Proposed Work Plan

To deliver the required TIA the following activities are required;

1. Site assessment of the sight distance at the Highway 567 access intersection,

2. Traffic analysis as per the AT requirements including a review of operation and capacities of the access intersection on Highway 567 and identification of required improvements.

3. Preparation of the TIA Report

Fee Estimate

Fees required to complete this project should not exceed $9,900.- (GST not included). A detailed fee estimate attached. Please note that as per the company policy we will require a written confirmation to proceed and a $2,000.- retainer which will be applied toward the last invoice.

Schedule

This standard time period to complete the above work is 6 to 8 weeks from receipt of the written confirmation and retainer.

Should you have any questions or require additional information please contact me at (403) 569-8721.

Regards

From: Tige Brady [mailto:tige.brady@telus.net]
Sent: July-16-14 9:16 AM
To: Tomasz Kroman
Cc: Mitch Schaufler; Kim Wolkowski
Subject: Site Context Plan for TIA

As per your request, please see the attached. Please provide a cost estimate to complete this work at your earliest convenience.

Regards,

Tige Brady, C.E.T.

Sent from my BlackBerry 10 smartphone on the Rogers network.

WATT Consulting Group
Since 1983

Tomasz Kroman, M.Sc., P.Eng
Senior Consultant

P 403.273.9001 ext 721
D 403.569.8721
C 403.608.1696
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#310, 3016 - 5 Avenue NE
Calgary, Alberta T2A 6K4

Take a look at the changes we've made at http://www.wattconsultinggroup.com

Kayla Royce, B.Sc., E.I.T.
Transportation Engineer

P 403.273.9001 ext 272
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Take a look at the changes we've made at http://www.wattconsultinggroup.com