

27 February 2024
Project: 230251

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**RE: 8075 HIGHWAY 7, GUELPH-ERAMOSA
TRANSPORT ESTABLISHMENT – TRANSPORTATION IMPACT BRIEF**

Paradigm Transportation Solutions Limited (Paradigm) has prepared this Transportation Impact Brief (TIB) for the proposed Transport Establishment located at 8075 Highway 7 in the Township of Guelph-Eramosa.

The subject property is located in the southwest quadrant of the intersection of Highway 7 and Wellington Road 29 (WR 29), 130 metres west of WR 29 and 120 metres south of Highway 7, as illustrated in the attached **Figure 1**.

The proposed Transport Establishment will provide a secure parking facility for trucks and trailers which will include trailers loaded with products as well as empty trailers. The purpose of parking trailers loaded with products is to provide a temporary but secure warehousing arrangement for clients until their final delivery.

The facility will have a single access on WR 29 and will have no direct access to Highway 7 and is expected to be operational in 2025.

The facility will have a usable area of 32.2 hectares and will operate 24 hours per day and seven days per week. As such, truck operations at the site are expected to involve low truck traffic volumes spread over a whole day without significant peaking.

Figure 2 (attached) illustrates the Concept Development Plan.

The proposed development is subject to the Ministry of Transportation Ontario (MTO) review and permit approvals. The MTO has indicated the requirement for a Transportation Impact Brief (TIB) to assess the impacts of the proposed facility.

This TIB has been prepared in consultation with MTO and includes estimates of development traffic generation; the analysis of intersection operations at Highway 7 and WR 29 under existing and future traffic conditions; as well as operational review of the proposed access on WR 29.

Existing traffic conditions correspond to the year 2024, and future traffic conditions are analysed for 2025 and 2030.

Appendix A includes pre-study correspondence with MTO.

Highway 7 & Wellington Road 29

The main roadways near the subject development considered in assessing the traffic impacts of the development are summarized below.

Highway 7 is a provincial highway with a two-lane cross section. The posted speed limit is 80 km/h, and the roadway is assumed to be oriented east-west.

Wellington Road (WR) 29 is a county road with a two-lane cross section. A rail line intersects the roadway 25 metres north of Highway 7. It is also noted that signage is posted on WR 29 south of Highway 7 stating that there is no exit for heavy truck traffic south of Highway 7. The posted speed limit is 80 km/h, and the roadway is assumed to be oriented north-south.

Traffic signals are provided at the intersection of Highway 7 and Wellington Road 29. The lane configuration and traffic control at the intersection are illustrated in **Figure 1**.

As shown in **Figure 1**, exclusive left-turn lanes are provided on all approaches, and an exclusive right-turn lane is provided on the westbound approach.

Trip Generation Estimates

Proxy Site

The trip generation estimates for the proposed facility are based on recent data from a proxy site, as the Institute of Transportation Engineers (ITE) Trip Generation Manual does not have land use information similar to the subject development.

The proxy site is located approximately 40 kilometres east of the subject site at 13726 Airport Road in Caledon. The proxy site has an area of 10.5 ha and operates as a truck and trailer parking facility 24 hours per day, seven days per week.

This proxy site was confirmed and deemed acceptable with the Ministry during pre-study consultation.

The data for the proxy site was obtained from the Traffic Brief for 12541 and 12577 Airport Road¹. The data were collected on 13-14 August 2020 during the morning (7:00 am – 9:00 am) and afternoon (4:00 pm – 6:00 pm) peak periods of the adjacent roadway volumes.

¹ Prepared by Nextrans Consulting Engineers, "Proposed Transport Truck / Trailer Parking Facility, 12541 & 12577 Airport Road, Town of Caledon Traffic Brief", 18 March 2022.



The proxy site traffic AM and PM peak hours are noted to occur from 7:45 AM to 8:45 AM, and from 4:00 PM to 5:00 PM.

Table 1 summarizes the derivation of trip generation rates for the proxy site.

As shown in **Table 1**, observed peak hour traffic volumes include both passenger cars and trucks, and the truck traffic volumes are expressed as Passenger Car Equivalent (PCE) volumes, using a conversion factor of 2².

TABLE 1: PROXY SITE TRIP GENERATION

Site Location	Land Area	AM Peak Hour				PM Peak Hour			
		In	Out	Total	Rate	In	Out	Total	Rate
13726 Airport Road, Caledon (Passenger Cars)	10.50 ha	5	2	7	0.67	6	2	8	0.76
13726 Airport Road, Caledon (Trucks x2 in PCEs)		0	4	4	0.38	6	16	22	2.10
Total Trip Generation (PCEs)		5	6	11	1.05	12	18	30	2.86

The AM/PM peak hour trip generation rates of 1.05 and 2.86 (PCEs) were applied to the proposed truck and trailer parking facility in Guelph-Eramosa.

Table 2 summarizes the forecast number of net new trips generated by the proposed facility, with truck trips shown in PCE volumes.

TABLE 2: TRIP GENERATION

Trip Generation	Land Area	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
Passenger Cars	32.22 ha	0.67	16	6	22	0.76	18	6	24
Trucks x2 in PCEs		0.38	0	12	12	2.10	19	49	68
Total Trip Generation (PCEs)			16	18	34		37	55	92

Trip Distribution

The trip distribution was determined based on existing distribution at the intersection of Highway 7 and WR 29 and the expected routing of vehicle trips. It is noted that the likely route for vehicles to/from the site will be through Highway 7. **Table 3** displays the breakdown of trip distributions used in this study.

² Canadian Capacity Guide, February 2008.



TABLE 3: SITE TRIP DISTRIBUTION

Distribution	Percentage
East via Highway 7	60%
West via Highway 7	40%
Total	100%

Figure 3 (attached) illustrates the AM and PM peak hour site-generated traffic volumes.

Traffic Operational Analysis

Base Year Traffic Conditions

MTO provided the turning movement count at the intersection of Highway 7 and WR 29, which was collected by the Ministry on 11 August 2022. The volumes were grown to a base year 2024 by applying a 2.0% per annum growth rate.

Figure 4 (attached) illustrates the base year (2024) AM (7:45 – 8:45) and PM (4:30 – 5:30) peak hour turning movements at the intersection of Highway 7 and WR 29.

Appendix B contains the detailed turning movement count and signal timing plan.

The level of service conditions at the intersection of Highway 7 and WR 29 have been assessed through intersection operational analysis using Synchro 11. The analysis has been completed in accordance with the requirements detailed by the MTO Traffic Impact Study (TIS) Guidelines³ and the Wellington County TIS Guidelines⁴.

Table 4 summarizes the results of the 2024 base year traffic operations. The results indicate that the study area intersections are operating at acceptable levels of service and with no problem movements during the AM and PM peak hours.

Appendix C contains the supporting detailed Synchro 11 reports.

³ MTO, General Guidelines for Preparation of Traffic Impact Studies, February 2021.

⁴ Wellington County, *Road Action Master Plan* Appendix G: Traffic Impact Study Guidelines, 29 October 2021.



TABLE 4: BASE YEAR (2024) TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS	B	B	>	B	B	A	A	A	B	B	>	B	B	B	>	B	B
			Delay	11	11	>	11	14	9	7	9	18	16	>	16	16	15	>	15	12
			V/C	0.06	0.62	>		0.10	0.45	0.05		0.24	0.38	>		0.04	0.40	>		
			Q	0	4	>		0	2	0		1	1	>		0	0	>		
			Stor.	75	-	>		55	-	55		75	-	>		50	-	>		
			Avail.	75	-	>		55	-	55		74	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS	B	B	>	B	C	B	A	B	C	B	>	C	C	B	>	B	B
			Delay	18	17	>	17	24	14	10	14	25	20	>	22	24	18	>	19	18
			V/C	0.12	0.77	>		0.15	0.56	0.05		0.51	0.54	>		0.17	0.35	>		
			Q	2	7	>		2	2	0		10	8	>		3	4	>		
			Stor.	75	-	>		55	-	55		75	-	>		50	-	>		
			Avail.	73	-	>		53	-	55		65	-	>		47	-	>		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

</> - Shared with through movement

Background Traffic Conditions

Similar to the base year traffic volumes, a growth rate of 2.0% per annum was applied to the existing roadway traffic volumes to estimate the 2025 and 2030 background traffic volumes. This growth rate was confirmed with the Ministry and the County during the pre-study consultation. It is noted that no other area developments were identified to be included in the estimation of background traffic volumes.

Figure 5 (attached) and **Figure 6 (attached)** respectively illustrate the 2025 and 2030 background traffic volumes.

The 2025 and 2030 background traffic volumes have been analyzed using the same methodology as under base year traffic conditions. Signal timings have not been optimized.

Table 5 summarizes the results of the 2025 and 2030 background traffic operations. The results indicate that the study area intersections are forecast to operate at acceptable levels of service and with no problem movements during the AM and PM peak hours.

Appendix D contains the supporting detailed Synchro 11 reports.



TABLE 5: 2025 AND 2030 BACKGROUND TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
2025 Background Traffic Conditions																				
AM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	B 11	B 11	>	B 11	B 14	A 9	A 7	A 10	B 18	B 16	>	B 16	B 16	B 15	>	B 15	B 12
			V/C	0.06	0.64	>		0.11	0.46	0.05		0.25	0.39	>		0.04	0.41	>		
			Q	0	4	>		0	2	0		1	1	>		0	0	>		
			Stor.	75	-	>		55	-	55		75	-	>		50	-	>		
			Avail.	75	-	>		55	-	55		74	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	B 18	B 19	>	B 18	C 26	B 14	A 10	B 14	C 26	C 20	>	C 22	C 25	B 18	>	B 20	B 18
			V/C	0.12	0.78	>		0.16	0.56	0.05		0.52	0.55	>		0.17	0.36	>		
			Q	2	8	>		3	3	0		12	10	>		3	5	>		
			Stor.	75	-	>		55	-	55		75	-	>		50	-	>		
			Avail.	73	-	>		52	-	55		63	-	>		47	-	>		
2030 Background Traffic Conditions																				
AM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	B 12	B 12	>	B 12	B 16	A 10	A 7	B 10	B 19	B 16	>	B 17	B 17	B 16	>	B 16	B 13
			V/C	0.07	0.69	>		0.13	0.50	0.05		0.28	0.41	>		0.04	0.43	>		
			Q	0	4	>		0	2	0		1	1	>		0	1	>		
			Stor.	75	-	>		55	-	55		75	-	>		50	-	>		
			Avail.	75	-	>		55	-	55		74	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	C 22	C 23	>	C 22	C 32	B 16	B 11	B 16	C 31	C 24	>	C 27	C 30	C 21	>	C 23	C 22
			V/C	0.14	0.82	>		0.21	0.59	0.06		0.60	0.58	>		0.21	0.38	>		
			Q	3	19	>		5	6	0		24	25	>		6	14	>		
			Stor.	75	-	>		55	-	55		75	-	>		50	-	>		
			Avail.	72	-	>		50	-	55		51	-	>		44	-	>		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

</> - Shared with through movement

Total Traffic Conditions

Figure 7 (attached) and **Figure 8 (attached)** respectively illustrate the 2025 and 2030 total traffic volumes.

The 2025 and 2030 total traffic volumes have been analyzed using the same methodology as under existing and background traffic conditions. Signal timings have not been optimized.

Table 6 summarizes the results of the 2025 and 2030 total traffic operations. The results indicate that the intersection of WR 29 and Highway 7, and WR 29 and the Site Driveway are forecast to operate at acceptable levels of service during the AM and PM peak hours.

Appendix E contains the supporting detailed Synchro 11 reports.



TABLE 6: 2025 AND 2030 TOTAL TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction/Movement/Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
2025 Total Traffic Conditions																				
AM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	B 11	B 11	>	B 11	B 15	A 9	A 7	A 10	B 18	B 16	>	B 16	B 17	B 15	>	B 15	B 12
			V/C	0.06	0.65	>		0.14	0.46	0.05		0.27	0.42	>		0.04	0.40	>		
			Q	0	4	>		0	2	0		1	1	>		0	0	>		
			Stor. Avail.	75	-	>		55	-	55		75	-	>		50	-	>		
AM Peak Hour	Wellington Road 29 & Site Driveway	TWSC	LOS Delay	B 12		>	B 12					<	A 0		A 0		A 0	>	A 0	
			V/C	0.04		>						<	0.00			0.00	>			
			Q	1		>						<	0			0	>			
			Stor. Avail.	75	-	>		55	-	55		74	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	B 19	B 20	>	B 19	C 30	B 15	B 11	B 16	C 29	C 23	>	C 25	C 29	C 20	>	C 22	C 20
			V/C	0.12	0.78	>		0.27	0.55	0.05		0.58	0.60	>		0.19	0.35	>		
			Q	2	9	>		7	2	0		20	21	>		5	10	>		
			Stor. Avail.	75	-	>		55	-	55		75	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Site Driveway	TWSC	LOS Delay	C 18		>	C 18					<	A 0		A 0		A 0	>	A 0	
			V/C	0.18		>						<	0.00			0.00	>			
			Q	4		>						<	0			0	>			
			Stor. Avail.	75	-	>		55	-	55		55	-	>		45	-	>		
2030 Total Traffic Conditions																				
AM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	B 12	B 12	>	B 12	B 17	A 10	A 7	B 10	B 20	B 17	>	B 18	B 18	B 16	>	B 16	B 13
			V/C	0.07	0.69	>		0.16	0.49	0.05		0.30	0.43	>		0.05	0.42	>		
			Q	0	4	>		1	2	0		1	1	>		0	1	>		
			Stor. Avail.	75	-	>		55	-	55		75	-	>		50	-	>		
AM Peak Hour	Wellington Road 29 & Site Driveway	TWSC	LOS Delay	B 13		>	B 13					<	A 0		A 0		A 0	>	A 0	
			V/C	0.04		>						<	0.00			0.00	>			
			Q	1		>						<	0			0	>			
			Stor. Avail.	75	-	>		54	-	55		74	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Highway 7	TCS	LOS Delay	C 25	C 24	>	C 25	D 38	B 17	B 12	B 19	D 37	C 27	>	C 31	C 35	C 23	>	C 26	C 25
			V/C	0.14	0.83	>		0.34	0.58	0.06		0.67	0.63	>		0.23	0.37	>		
			Q	4	44	>		11	18	1		38	40	>		8	20	>		
			Stor. Avail.	75	-	>		55	-	55		75	-	>		50	-	>		
PM Peak Hour	Wellington Road 29 & Site Driveway	TWSC	LOS Delay	C 20		>	C 20					<	A 0		A 0		A 0	>	A 0	
			V/C	0.20		>						<	0.00			0.00	>			
			Q	5		>						<	0			0	>			
			Stor. Avail.	75	-	>		44	-	54		37	-	>		42	-	>		

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

V/C - Volume to Capacity Ratio

Q - 95th Percentile Queue Length (m)

Stor. - Existing Storage (m)

Avail. - Available Storage (m)

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

</> - Shared with through movement

Queue Analysis

In addition to the Synchro 11 analysis, queue length analyses for through and left-turn lanes were carried out at all movements of the Highway 7 and WR 29 intersection.



This method was completed using the MTO Traffic Signal Operating and Timing Policy⁵ Table 1 under Level of Service (LOS) A conditions and assuming a vehicle length of 7.5 metres.

In addition, queue length analysis for the westbound right-turn lane was carried out at the above intersection. This was completed using the methodology outlined in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁶. The right-turn queue length is calculated by multiplying the average number of vehicles stored per cycle by 2 for roadways with design speeds greater than 60 km/h.

These methods require the conversion of volumes to Passenger Car Equivalents (PCE) by multiplying the number of heavy vehicles by a conversion factor of 2⁷. It is noted that the truck trips generated by the development were also converted to PCEs, and therefore this analysis conservatively accounts for the site traffic.

Table 7a and **Table 7b** summarize the results of the queue length analysis under base year, background, and total traffic conditions. The results indicate that the northbound left-turn movement is forecast to operate with queues exceeding the existing storage of 75 metres under 2030 total traffic volumes during the PM peak hour.

It is noted that the projected queue lengths on Highway 7, for eastbound and westbound left-turns and for westbound right-turns under all traffic conditions, are within the available storage lengths.

⁵ Traffic Signal Operating and Timing Policy 2010-02, Ministry of Transportation Ontario, June 2016.

⁶ Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads, 2017.

⁷ Canadian Capacity Guide, February 2008.



TABLE 7A: THROUGH AND LEFT-TURN QUEUE ANALYSIS – HIGHWAY 7 AND WELLINGTON ROAD 29

Horizon	Lane	# of Lanes	Cycle Length (s)		Volumes (vph)		m _L max	Calc'd Length per Lane (m)	Available Length
			AM	PM	AM	PM			
2024 Base Year	EBL	1	102	102	27	40	1.1	22.5	75
	EBTR	1			469	614	17.4	180.0	-
	WBL	1			37	33	1.0	22.5	55
	WBT	1			352	457	12.9	142.5	-
	NBL	1			78	179	5.1	67.5	75
	NBTR	1			144	282	8.0	97.5	-
	SBL	1			12	46	1.3	22.5	50
	SBTR	1			151	189	5.4	67.5	-
2025 Background	EBL	1	102	102	27	41	1.2	22.5	75
	EBTR	1			478	626	17.7	187.5	-
	WBL	1			38	34	1.1	22.5	55
	WBT	1			359	467	13.2	142.5	-
	NBL	1			80	183	5.2	67.5	75
	NBTR	1			147	288	8.2	97.5	-
	SBL	1			12	47	1.3	22.5	50
	SBTR	1			154	194	5.5	75.0	-
2025 Total	EBL	1	102	102	27	41	1.2	22.5	75
	EBTR	1			484	641	18.2	187.5	-
	WBL	1			49	56	1.6	30.0	55
	WBT	1			359	467	13.2	142.5	-
	NBL	1			87	205	5.8	75.0	75
	NBTR	1			159	321	9.1	105.0	-
	SBL	1			12	47	1.3	22.5	50
	SBTR	1			154	194	5.5	75.0	-
2030 Background	EBL	1	102	102	31	45	1.3	22.5	75
	EBTR	1			528	691	19.6	202.5	-
	WBL	1			41	37	1.2	22.5	55
	WBT	1			396	515	14.6	157.5	-
	NBL	1			87	201	5.7	75.0	75
	NBTR	1			163	318	9.0	105.0	-
	SBL	1			14	52	1.5	30.0	50
	SBTR	1			170	214	6.1	75.0	-
2030 Total	EBL	1	102	102	31	45	1.3	22.5	75
	EBTR	1			534	706	20.0	210.0	-
	WBL	1			52	59	1.7	30.0	55
	WBT	1			396	515	14.6	157.5	-
	NBL	1			95	223	6.3	82.5	75*
	NBTR	1			175	351	9.9	112.5	-
	SBL	1			14	52	1.5	30.0	50
	SBTR	1			170	214	6.1	75.0	-

* Storage extends beyond length of solid line.



TABLE 7B: RIGHT-TURN QUEUE ANALYSIS – HIGHWAY 7 AND WELLINGTON ROAD 29

Horizon	Movement	Cycle Length (s)		Right Turn Volume		Average Arrival		Calc'd Length (m)		Existing Storage
		AM	PM	AM	PM	AM	PM	AM	PM	
2024 Base Year	WBR	102	102	31	37	0.9	1	13.5	15.0	55
2025 Background	WBR	102	102	32	38	0.9	1.1	13.5	16.5	55
2025 Total	WBR	102	102	35	42	1	1.2	15.0	18.0	55
2030 Background	WBR	102	102	35	42	1	1.2	15.0	18.0	55
2030 Total	WBR	102	102	35	42	1	1.2	15.0	18.0	55

Sight Distance Assessment

Available sight distances for the proposed access point on WR 29 were measured using Google Maps and are compared with sight distance requirements identified in the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads⁸ (GDGCR).

Stopping and Decision Sight Distance requirements were reviewed for a vehicular speed of 90 km/h, 10 km/h higher than the posted speed limit of 80 km/h.

Table 8 summarizes the sight distance measurements and requirements at the access intersection on WR 29.

The left-turn from stop decision sight distance from the Site Driveway to WR 29, and the stopping sight distance for the northbound approach on WR 29 at the Site Driveway exceed the corresponding TAC requirements.

TABLE 8: SITE DRIVEWAY SIGHT DISTANCE ASSESSMENT

Intersection	Road Speed	Decision Sight Distance (m)				Stopping Sight Distance (m)	
		Left-Turn		Right-Turn			
		Required	Measured	Required	Measured	Required	Measured
Wellington Road 29 and Site Driveway	90 km/h	190	195	145	300+	160	165

Highway 7 and WR 29 Intersection

As required by MTO, an AutoTURN assessment has been completed for the intersection of Highway 7 and WR 29 using WB-20.5 as the design vehicle.

The assessment was carried out for the following turning movements:

- ▶ northbound left-turn;
- ▶ northbound right-turn;

⁸ Transportation Association of Canada, Geometric Design Guide for Canadian Roads, June 2017.



- ▶ westbound left-turn; and
- ▶ eastbound right-turn.

Appendix F contains the AutoTURN drawings.

The drawings indicate that the WB-20.5 design vehicle can make all of the above turns without encroaching into opposing traffic lanes. However, corner encroachments are noted given the existing curb locations and pavement widths.

Conclusions

Based on the analyses as outlined in this Brief, the existing intersection at Highway 7 and Wellington Road 29 is projected to operate with acceptable levels of service under future background and total traffic conditions. The proposed Site Driveway on Wellington Road 29 is also forecast to operate at acceptable levels of service under 2025 and 2030 total traffic conditions.

The left-turn from stop from the Site Driveway on Wellington Road 29 and the stopping sight distance from Wellington Road 29 approaching the Site Driveway satisfy sight distance requirements at 90 km/h, which is 10 km/h higher than the posted speed limit of 80 km/h.

We trust that this Letter Brief satisfies the requirement for assessing the traffic impacts of the proposed Transport Establishment at 8075 Highway 7, Guelph-Eramosa.

Please do not hesitate to contact us if you need additional information or input on this matter.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED



Rajan Philips

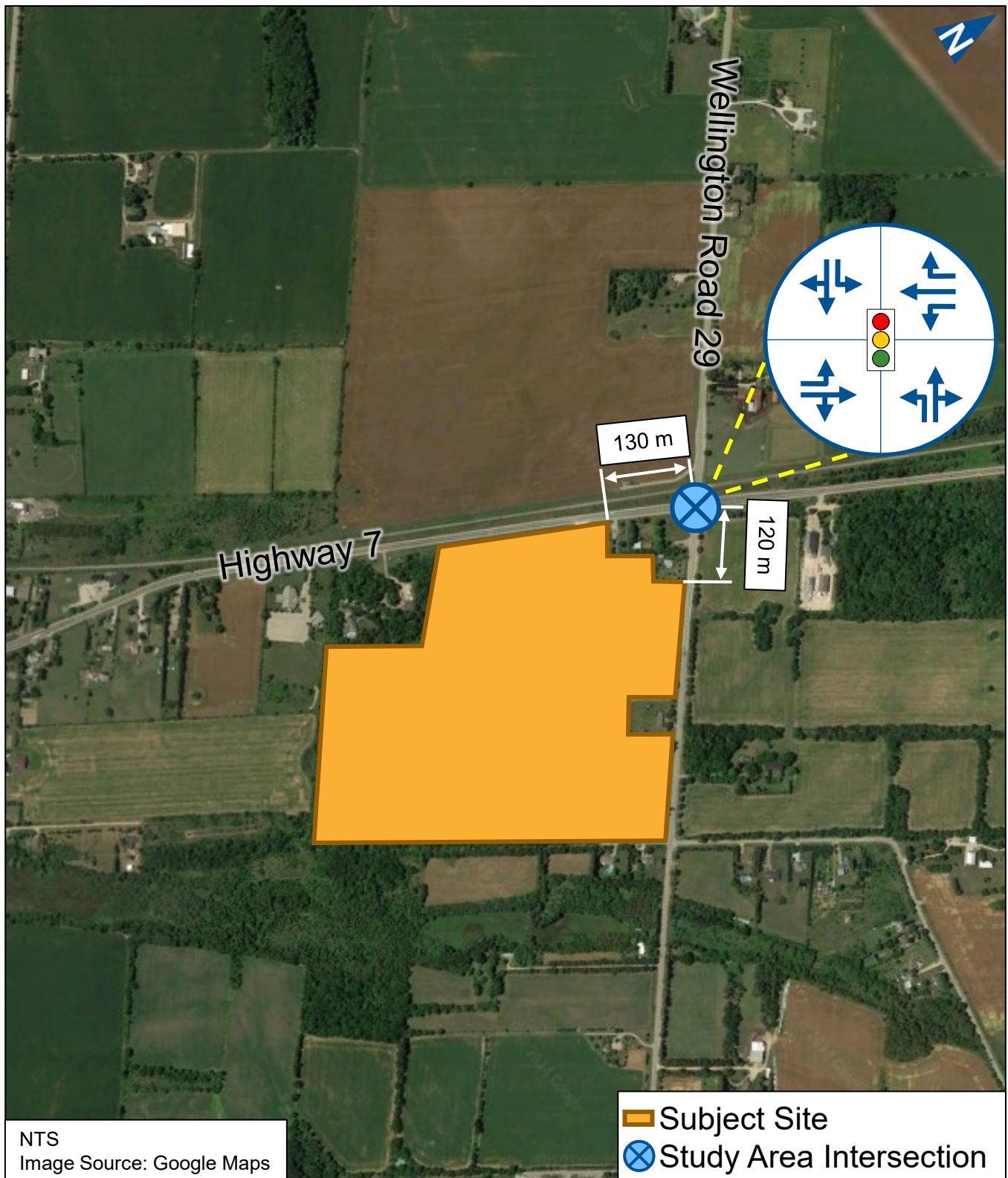
M.Sc., P.Eng.

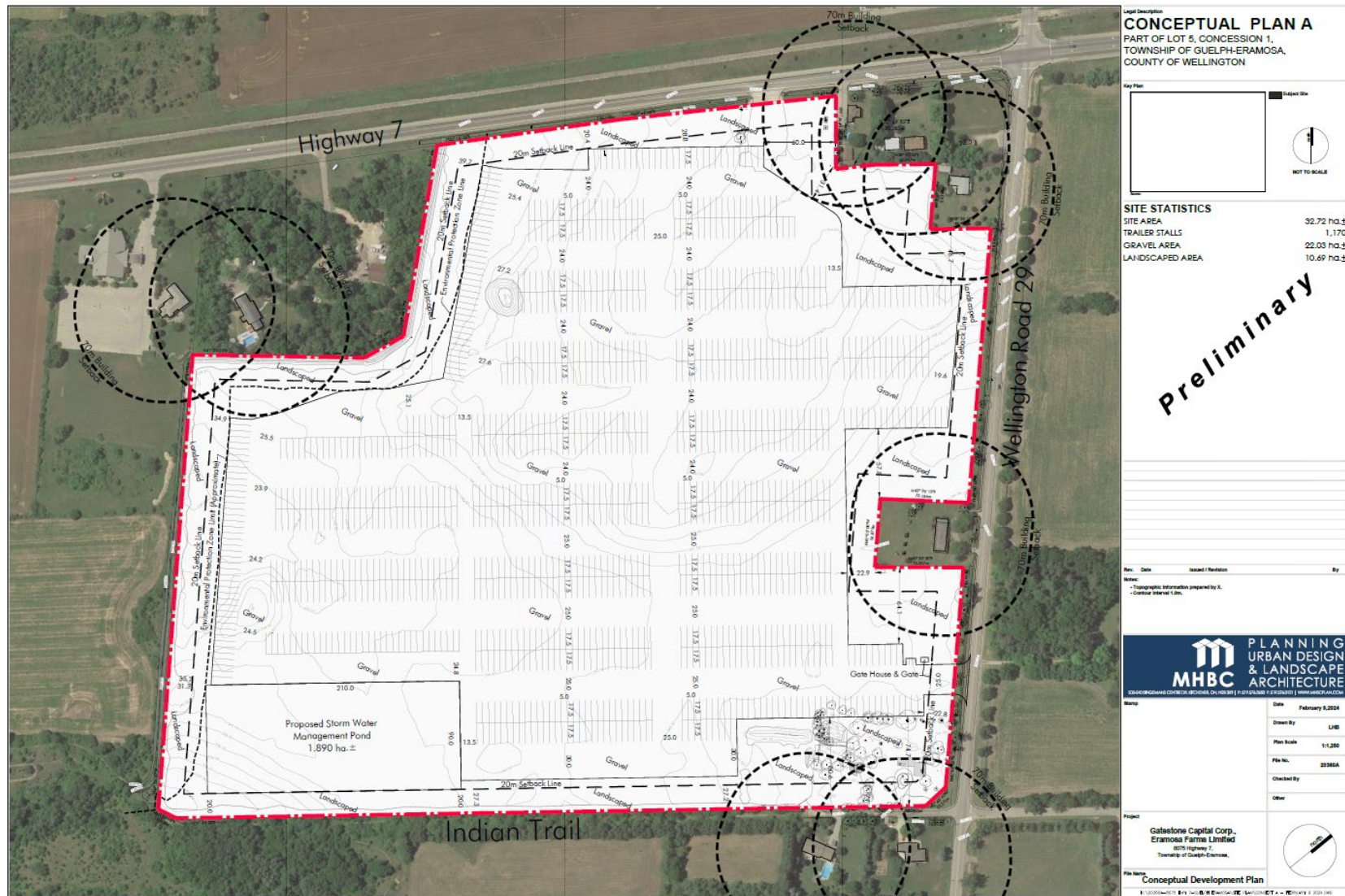
Senior Transportation Consultant



Attachments

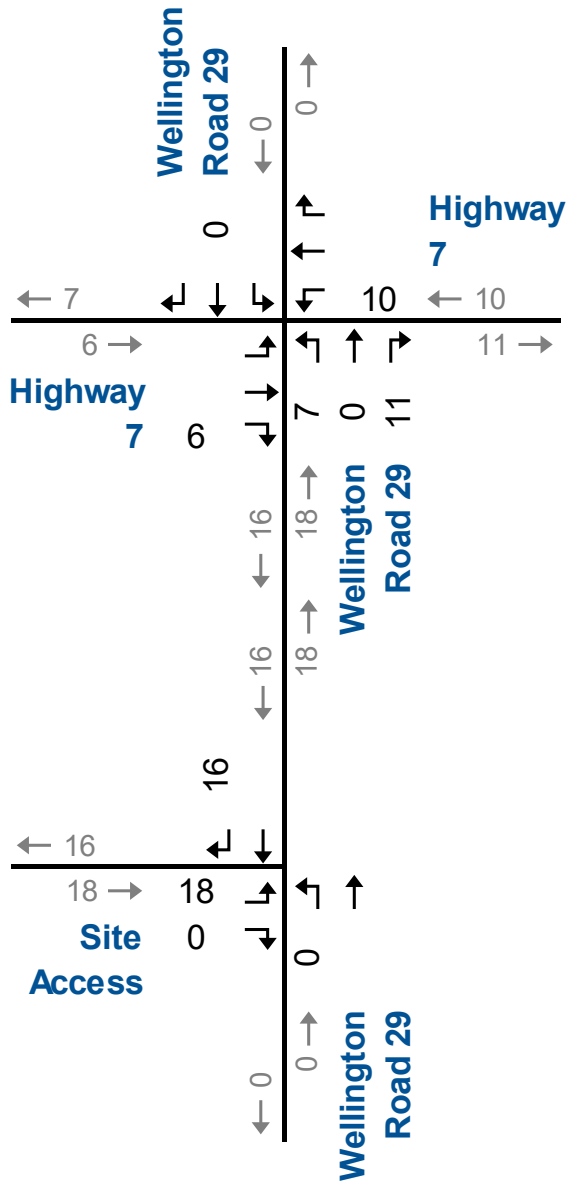




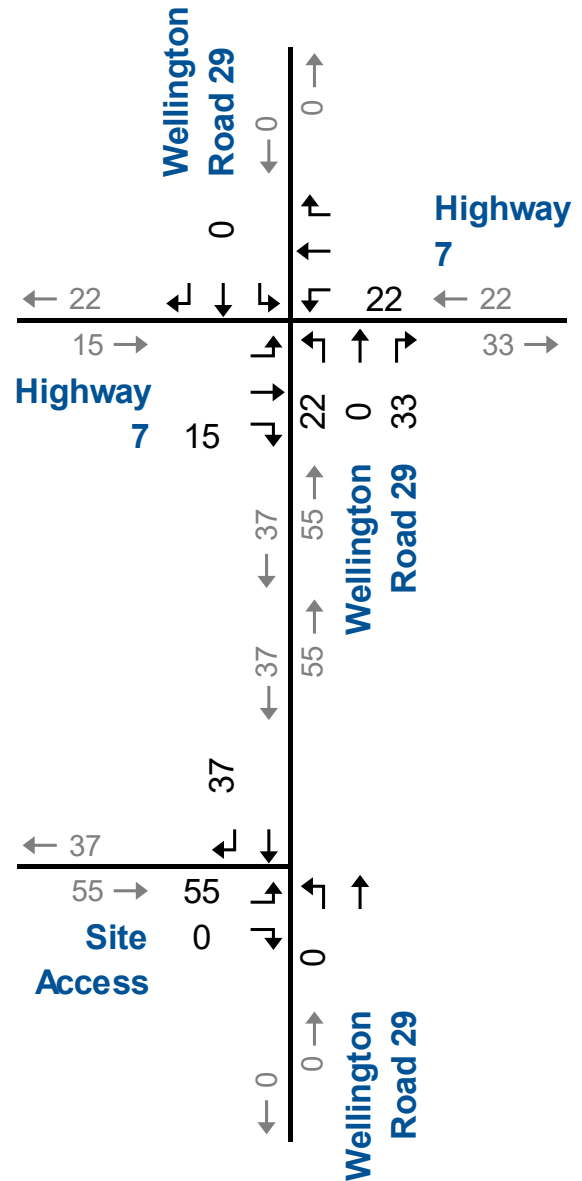




AM Peak Hour

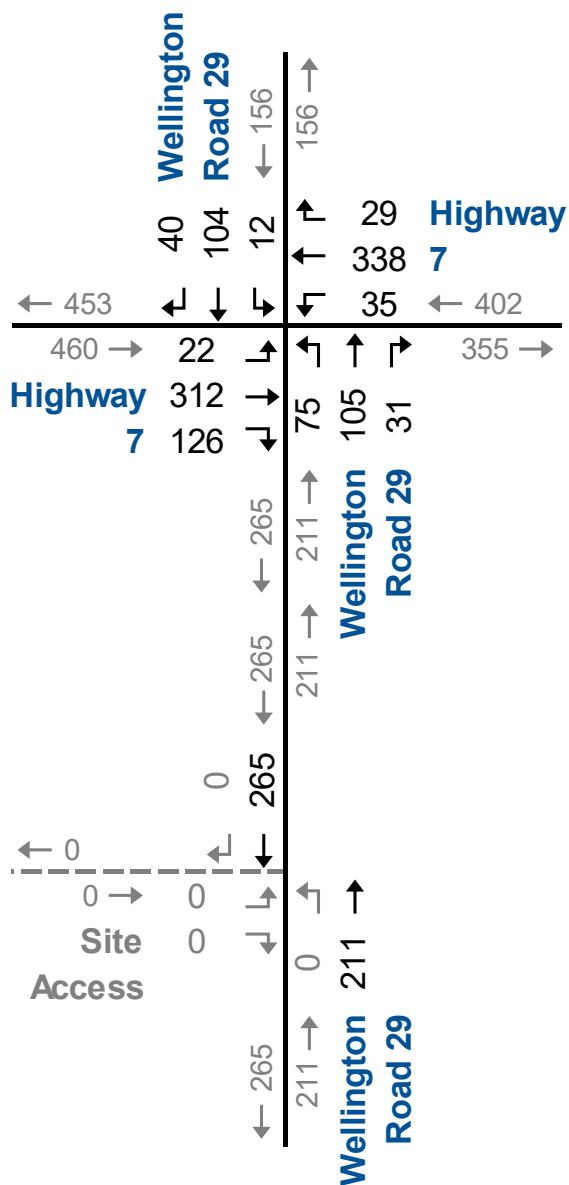


PM Peak Hour

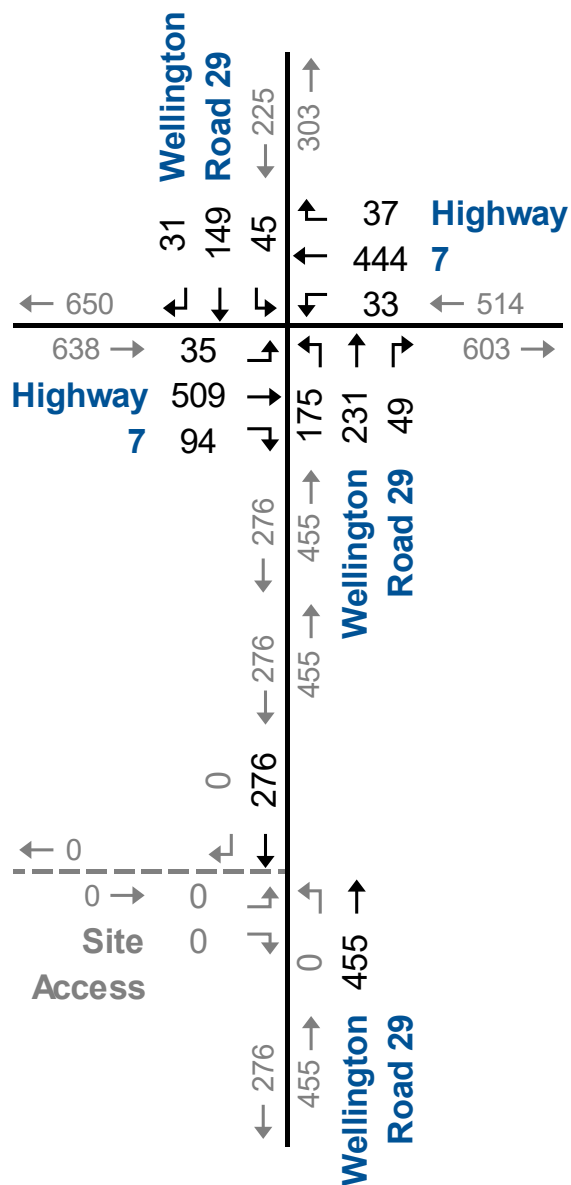




AM Peak Hour



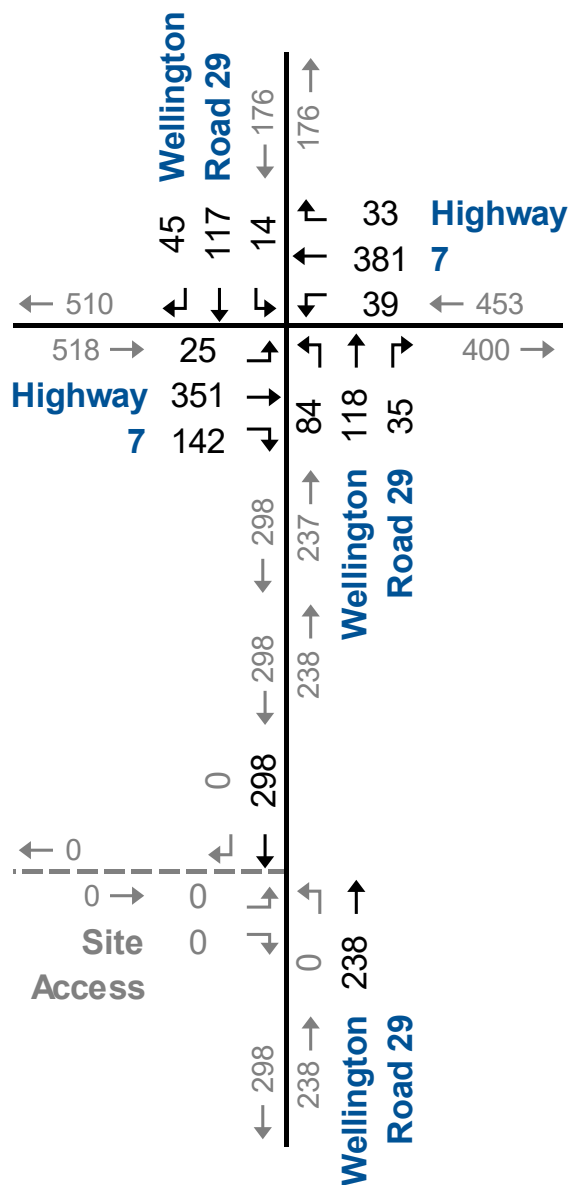
PM Peak Hour



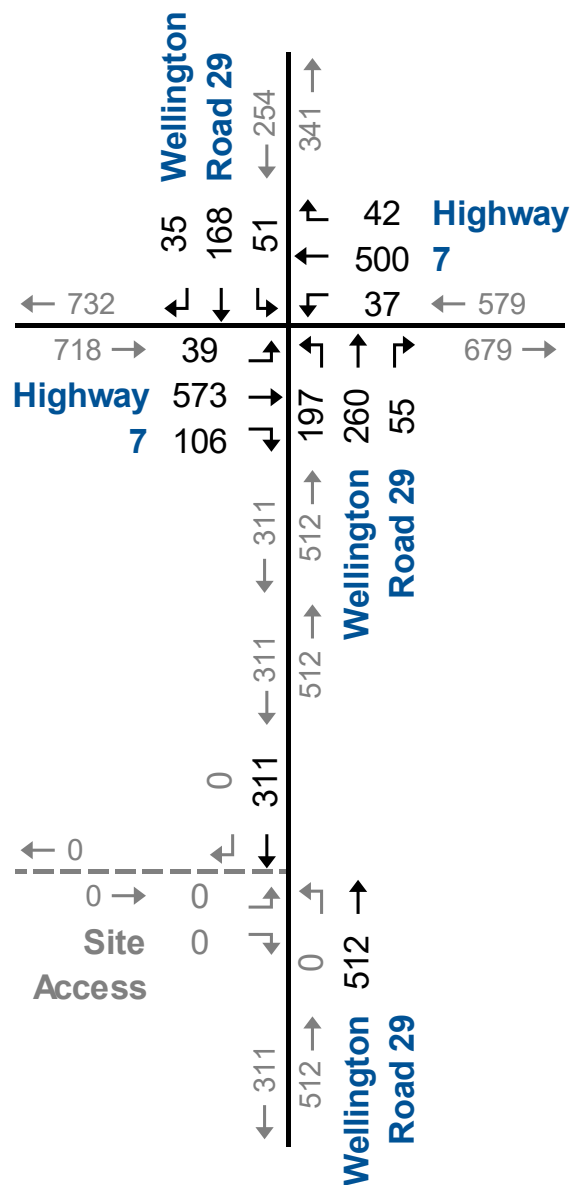




AM Peak Hour

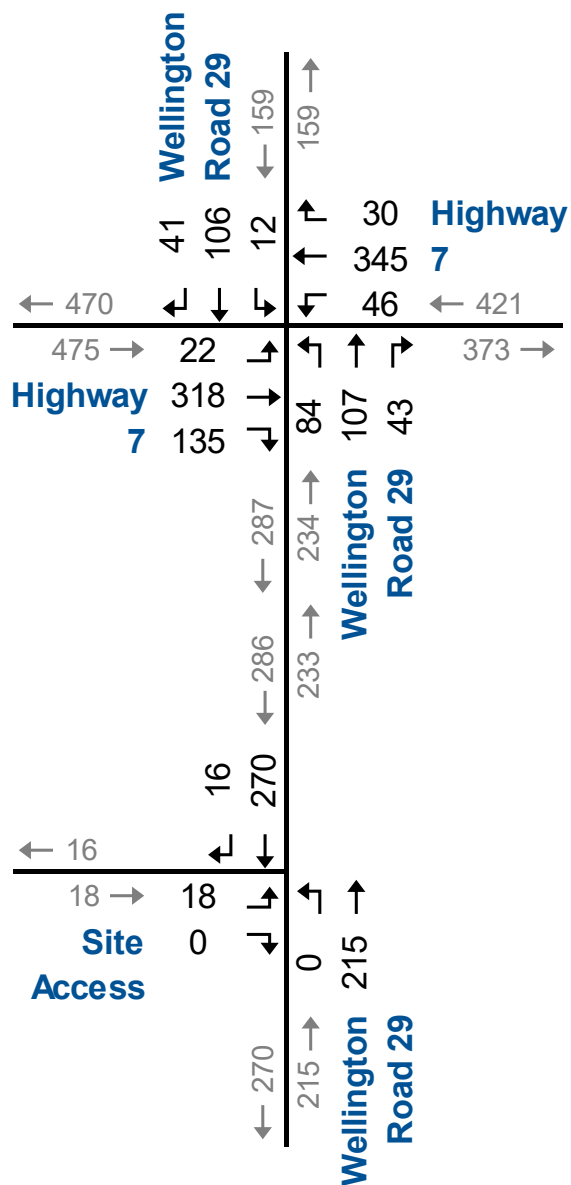


PM Peak Hour

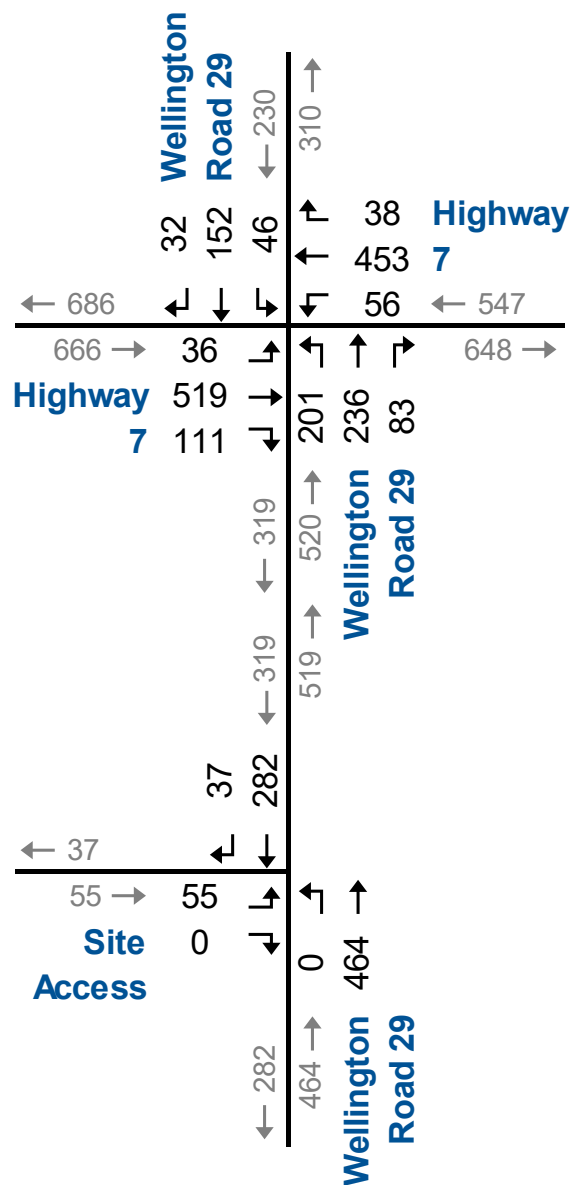




AM Peak Hour

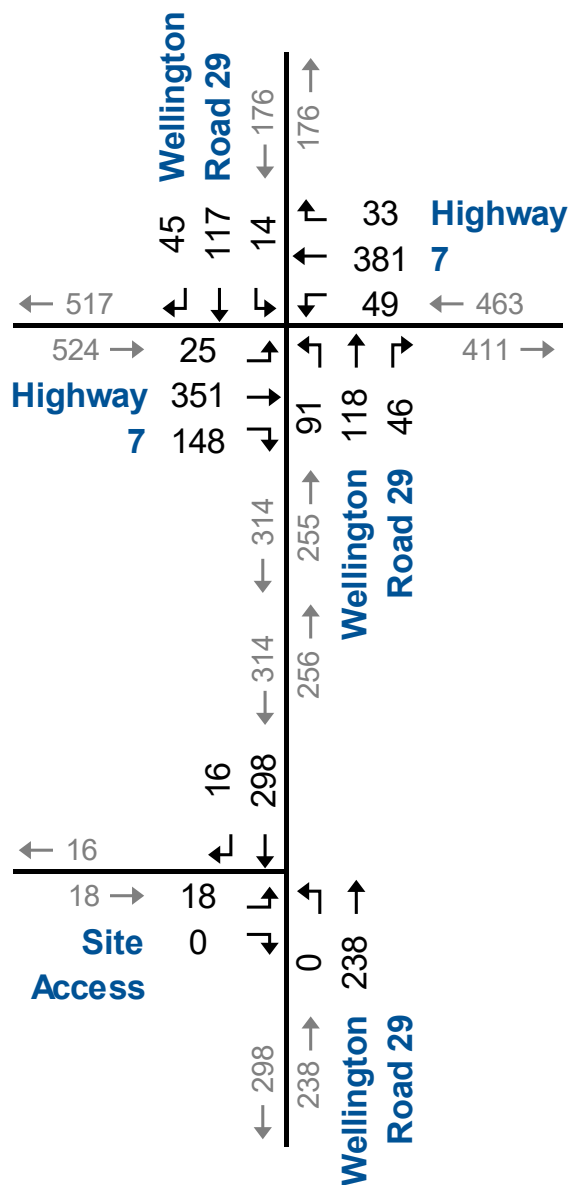


PM Peak Hour

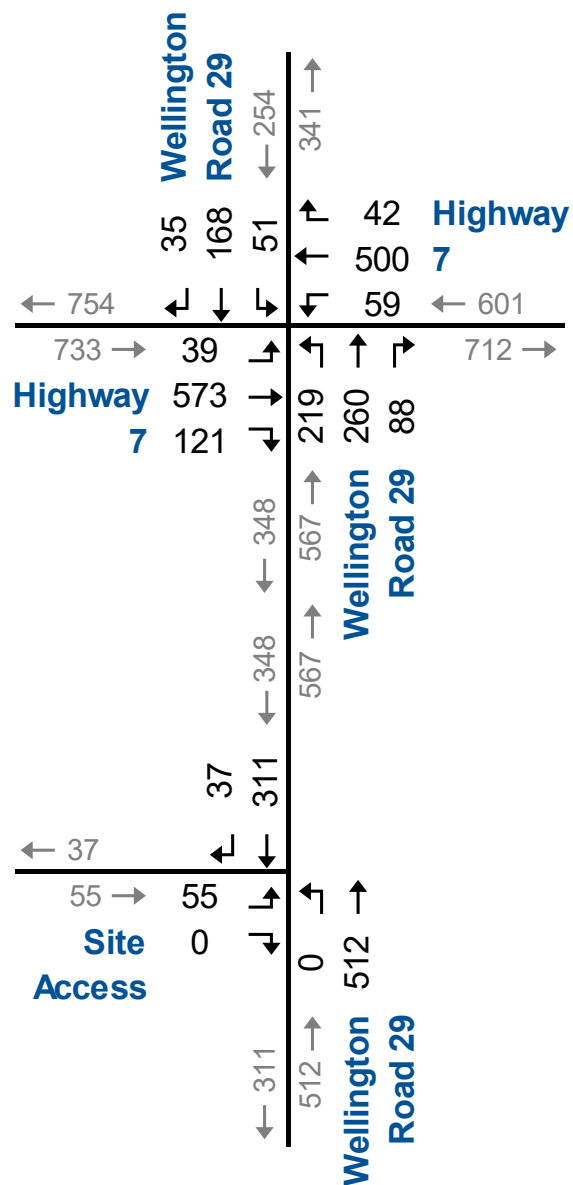




AM Peak Hour



PM Peak Hour



Appendix A

Pre-Study Consultation



From: [Hodgins, Allan \(MTO\)](#)
To: [Richard Parent](#)
Cc: [Trevor Hawkins](#); [Rajan Philips](#); [Patrick Neal](#)
Subject: RE: (230251) 8075 Highway 7, Guelph-Eramosa TIB - Pre-Study Consultation
Date: February 7, 2024 1:43:58 PM
Attachments: [image001.png](#)
[image002.png](#)
[image004.png](#)
[image005.png](#)
[image003.png](#)
[Traffic-Brief-Caledon--12.07.2021.pdf](#)

Hi Richard,

MTO Traffic staff have review the information provided below and offer the following comments:

- MTO will not require the analysis to include Saturday operations, however please provide a statement in the TIB, similar to below with respect to the weekend (24/7) operation.
- MTO have reviewed the proxy site proposed and find it acceptable to include in this analysis.

Please let me know if there is anything else I can be of assistance with, in advance of submitting the TIB for MTO review.

Regards,

[Allan Hodgins](#) | [Corridor Management Planner](#)

*The Ministry of Transportation of Ontario
West Operations Branch | Corridor Management Section, West
Ph. (226) 973-8580 | Fax (519) 873-4228
E-mail: allan.hodgins@ontario.ca*

From: Richard Parent <RParent@abarchitect.ca>
Sent: February 1, 2024 8:51 AM
To: Hodgins, Allan (MTO) <Allan.Hodgins@ontario.ca>; Pegelo, Jessica (MTO) <Jessica.Pegelo@ontario.ca>
Cc: Trevor Hawkins <thawkins@mhbcplan.com>; rphilips@ptsl.com; Patrick Neal <pneal@ptsl.com>
Subject: FW: (230251) 8075 Highway 7, Guelph-Eramosa TIB - Pre-Study Consultation

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Allan and Jessica.

Our transportation consultant is nearly completed the TIB. We note in your email below of Jan 4/24 the issue of Saturday operations and a proxy site. We would like to provide the following for your consideration:

Saturday Operations

This unique type of development operates 24 hours a day, 7 days a week. Since the trailer parking lot is accessible to clients anytime, they will drop off/pick up their trailers based on their needs. There is not an AM, PM nor Saturday peak hour. There are no staff at the proposed site. The only traffic coming to/from the site are trailers being picked up or dropped off to the parking lot, based on the need from the customer. The trips generated by this type of development are very low, and very sporadic.

Here are the draft trip generation rates:

Subject Site: 8075 Highway 7, Guelph-Eramosa

Trip Generation	Land Area	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
Passenger Cars	32.22 ha	0.67	16	6	22	0.76	18	6	24
Trucks x2 in PCEs		0.38	0	12	12	2.10	19	49	68
Total Trip Generation			16	18	34		37	55	92

We would opine that a Saturday assessment is not required, and request your consideration in this matter.

Proxy Site

Since this type of business need is very new, there are not many proxy sites to select from. We did find a proxy site located 50 kms easterly in Caledon. We have attached the TIS submitted in support of the development application as our proposed proxy site. The proposed operation is very similar to the proxy site in that customers are free to drop off or pick up their trailers based on their need, not on peak hour demand that you may find in a typical trucking operation where trucks leave in the AM peak hour, and return in the PM peak hour.

We respectfully request acceptance of the proposed proxy site.

Please do not hesitate to call me if you have any questions.

Richard
5197495013

Richard Parent
Strategic Operations Officer

T 519.884.2711 x 231
101 Randall Drive, Unit B
Waterloo, ON N2V 1C5

From: Hodgins, Allan (MTO) <Allan.Hodgins@ontario.ca>

Sent: Thursday, January 4, 2024 4:17 PM

To: Patrick Neal <pneal@pts1.com>; Pasquale Costanzo <pasqualec@wellington.ca>

Cc: Rajan Philips <rphilips@pts1.com>; thawkins@mhbcplan.com

Subject: RE: (230251) 8075 Highway 7, Guelph-Eramosa TIB - Pre-Study Consultation

Hello Patrick,

MTO has review the pre-study scope of work and have the following comments:

- The TIB is to be prepared by a RAQS qualified consultant and follow our TIS policy/guidelines (attached).
- If the operation will be opened on Saturdays, the TIB should provide an analysis that includes Saturday as well as weekday AM and PM peak.
 - Since it is a not typical site, the TIB can provide justification if they are open Saturdays but feel it is not required.
- Attached are MTO counts from 2022, should you wish to collect new data it shall be completed by a RAQS approved company.
- Signal timings attached.
- 2% GR is acceptable
- Per the TIS guidelines/policy, proxy sites need to be discussed and approved by MTO in advance of the preparation of the TIS/TIB.
 - Please reach out to myself for MTO availability to schedule a follow discussion
- Any sightlines reviewed should include measurable sightlines and compared to TAC.
- Horizon years can include full build out/opening day and 5 years.
- Queuing analysis will be required.
- In addition to consideration of heavy/commercial vehicles as part of the capacity analysis, for developments in which truck trip generation and their effects in the study area are relevant, the following information shall be included as part of the TIB (from our guidelines):
 - Existing conditions related to truck traffic
 - Relationship between land use and truck traffic
 - Physical requirements
- Auto-turn for Highway 7 and Wellington Rd 29 intersection demonstrating that a WB 20.5 can make the turns should be included in the TIB.

Our Corridor Office has had some staffing resulting in area of responsibilities being shifted, please note Jessica Pegelo is no longer involved with planning related files within Wellington County.

Please reach out to myself for MTO availability to schedule a follow discussion should you or your require.

Regards,

[Allan Hodgins](#) | Corridor Management Planner

The Ministry of Transportation of Ontario

West Operations Branch | Corridor Management Section, West

Ph. (226) 973-8580 | Fax (519) 873-4228

E-mail: allan.hodgins@ontario.ca

From: [Kooistra, Tim](#)
To: [Patrick Neal](#)
Cc: [Philippe Campbell](#); [Pegelo, Jessica, MTO](#); [Rajan Philips](#); thawkins@mhbcpplan.com
Subject: Re: FW: (230251) 8075 Highway 7, Guelph-Eramosa TIB - Pre-Study Consultation
Date: November 17, 2023 1:28:17 PM
Attachments: [image001.png](#)
[image003.png](#)

Good afternoon Patrick,

As you may be aware, Dillon Consulting Limited has been retained by the County of Wellington to review the proposed scope of work for transportation impact studies that may impact the County road network and associated intersections. As a result, this response is being provided on behalf of the County of Wellington for your consideration.

The scope you have identified is generally acceptable from the County's perspective. However, it's important to note that the following needs to be considered in the study:

- Any background developments that need to be explicitly considered in the study will need to be identified and confirmed by staff at Guelph Eramosa Township. Please ensure that you reach out to Planning staff to confirm this matter.
- Given the Highway 7 and Wellington Road 29 intersection is under the jurisdiction of the MTO, the MTO will need to provide you with the relevant signal timings for this study area intersection.

In the future, if a concept plan of the relevant proposed development is available to share, it would be appreciated if this drawing could be attached to your terms of reference.

Lastly, Wellington County has a Traffic Impact Study Guidelines document. This document can be found here: <https://www.wellington.ca/en/resident-services/resources/Roads/RMAP/RMAPFinal/Appendix-G---Traffic-Impact-Study-Guidelines-2021Updated.pdf>

Thanks and have a great weekend!

Tim



Tim Kooistra, C.E.T.
Dillon Consulting Limited
130 Dufferin Avenue Suite 1400
London, Ontario, N6A 5R2
T - 519.438.1288 ext. 1330
F - 519.672.8209
M - 519.851.5403
TKooistra@dillon.ca
www.dillon.ca



On Thu, Nov 16, 2023 at 10:56 AM Pasquale Costanzo <pasqualec@wellington.ca> wrote:

Hi Phil,

Could you look after this request with Tim at Dillon.

Thank you

Pasquale Costanzo, C.E.T., CMMII Infrastructure Specialist

Technical Services Supervisor

County of Wellington, Roads Division

T 519.837.2601 x 2250

E pasqualec@wellington.ca

From: Patrick Neal <pneal@ptsl.com>

Sent: Thursday, November 16, 2023 10:22 AM

To: Pegelo, Jessica (MTO) <Jessica.Pegelo@ontario.ca>; Pasquale Costanzo <pasqualec@wellington.ca>

Cc: Rajan Philips <rphilips@ptsl.com>; thawkins@mhbcplan.com

Subject: (230251) 8075 Highway 7, Guelph-Eramosa TIB - Pre-Study Consultation

CAUTION: This email originated from outside the organization. Do not click links or open attachments unless you know the contents to be safe.

Hi Jessica and Pasquale,

We have been retained to complete the Transportation Impact Brief (TIB) for the development of a Transport Establishment for accommodating a truck depot and truck trailers, located at 8075 Highway 7 in Guelph-Eramosa, Wellington County.

The subject property is located at the southwest corner of the intersection of Highway 7 and Wellington Road 29. The proposed Transport Establishment will provide for trucks and trailers to be parked on site, along with a small office and gate house for the entrance.

The proposed development will provide for secure parking of empty and loaded

tractor trailers of different client companies. The facility will have a single access on Wellington Road 29, and will have no direct access to Highway 7. Truck operations at the site are expected to involve low truck traffic volumes spread over a whole day without significant peaking.

The Ministry of Transportation Ontario (MTO) has indicated that *the TIB should provide information outlining traffic generation and distribution to the site.*

We have prepared the following scope of work for the TIB for review/approval:

- Weekday AM and PM peak hours of analysis
- Study Area Intersections:
 - o Highway 7 and Wellington Road 29 (signalized);
 - o Access intersection on Wellington Road 29.
- We will collect new counts at Highway 7 and Wellington Road 29.
- Horizon Years (as required by MTO): (1) anticipated year of completion, (2) five years after completion, and (3) ten years after completion.
- Background Growth: 2.0% compounded per annum, **please confirm.**
- Background Developments: **Please confirm** and provide corresponding site statistics or TIS.
- Trip Generation: Peak Hour and Daily trip generation will be estimated based on information from the client and data from proxy facilities that might be available with the client.
- Trip Distribution: Existing traffic patterns on Highway 7.
- The geometry, sightlines, auxiliary lanes, and traffic control will be reviewed at (1) Highway 7 and Wellington Road 29 and (2) access intersection on Wellington Road 29.
- **Signal timing information will be required if Synchro and queueing analyses are required.**

Please let us know if you have any questions or comments.

Regards,

Patrick Neal, EIT

Transportation Consultant

ParadigmEmailLogo



Paradigm Transportation Solutions Limited

5A-150 Pinebush Road, Cambridge ON N1R 8J8

p: 416.479.9684 x510

m: 416.688.7338

e: pneal@ptsl.com

w: www.ptsl.com



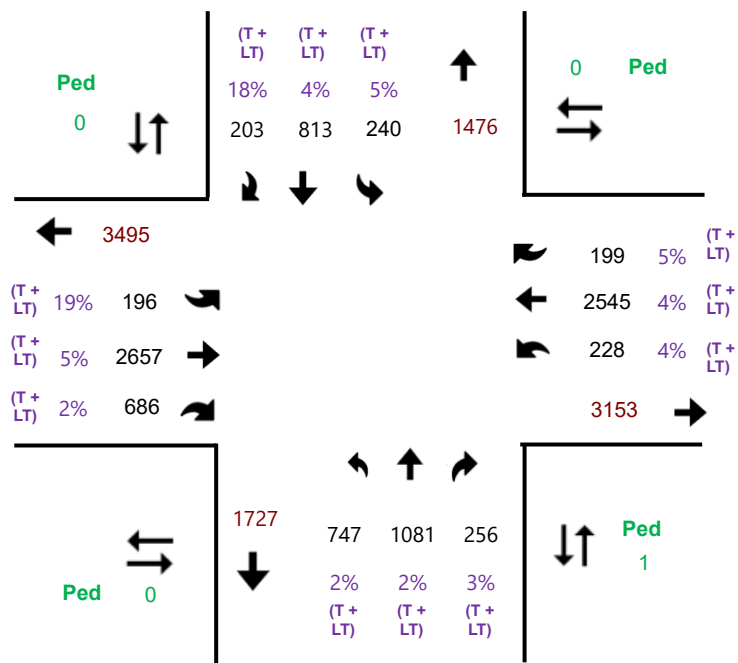
Appendix B

Existing Traffic Data

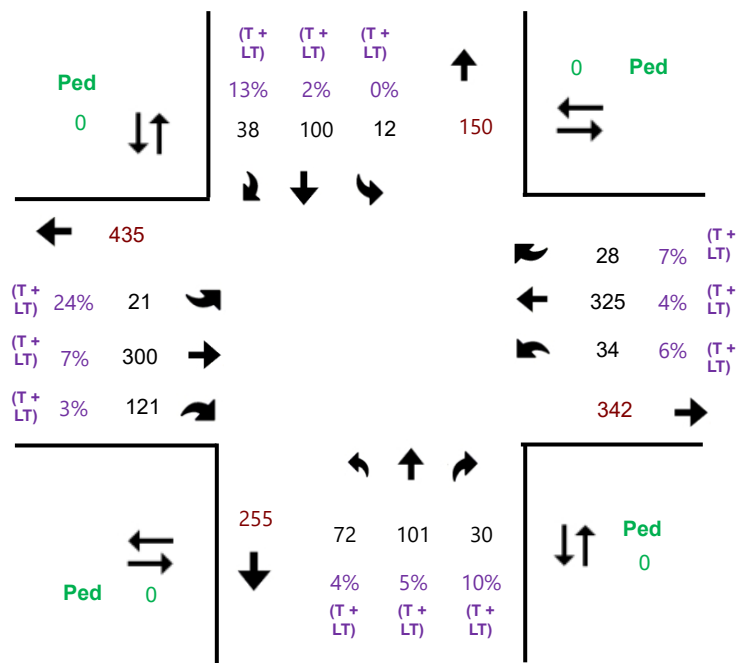


Description: HWY 7 @ WELLINGTON ROAD 29
Region: WEST
LHRS_Offset: 14540_0416
Count Date: Thursday, 11 August, 2022
Hwy #: HWY 7
Int. Type: Cross

Full Study Thu, 11 Aug, 2022 07:00 AM - 06:00 PM



AM Period Thu, 11 Aug, 2022 07:45 AM - 08:45 AM



Description: HWY 7 @ WELLINGTON ROAD 29

Region: WEST

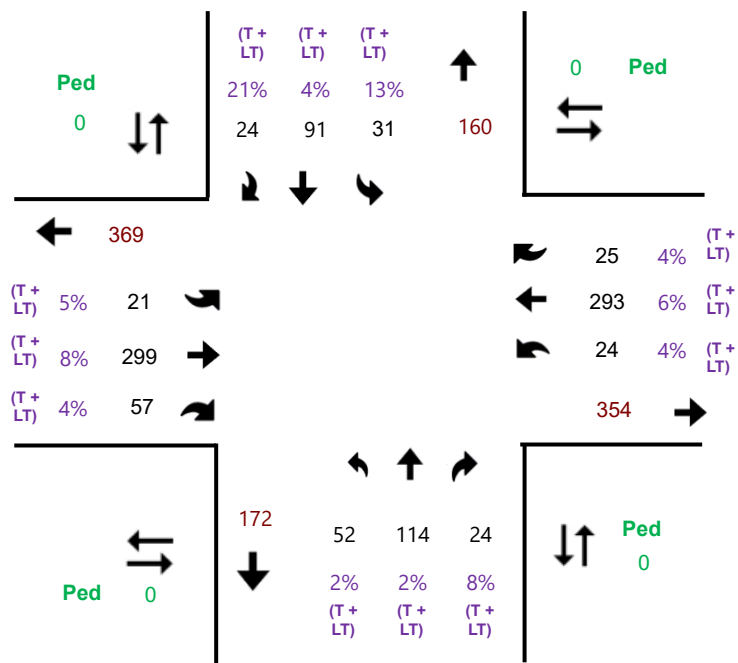
Hwy #: HWY 7

LHRS_Offset: 14540_0416

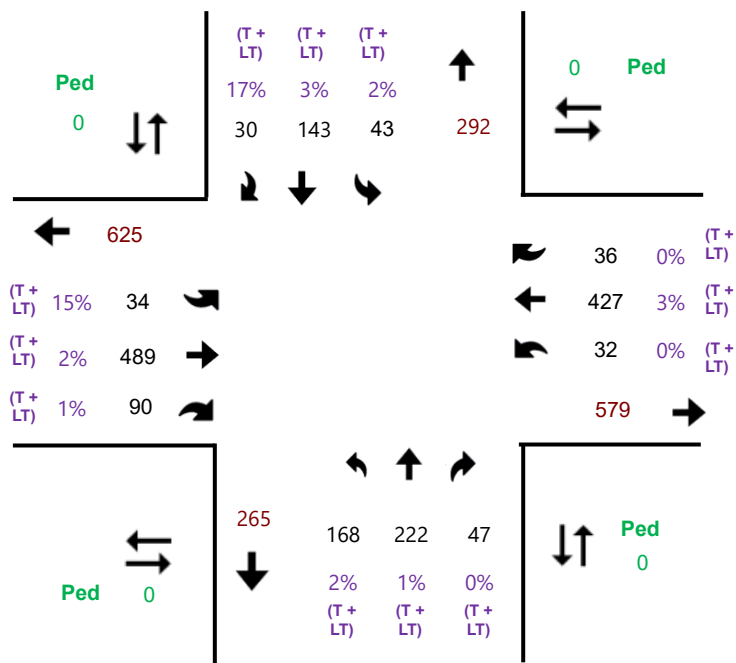
Int. Type: Cross

Count Date: Thursday, 11 August, 2022

MD Period Thu, 11 Aug, 2022 11:45 AM - 12:45 PM



PM Period Thu, 11 Aug, 2022 04:30 PM - 05:30 PM



INTERSECTION: R1NL Hwy 7 @ Wellington Rd 29 (Eden Mills)

Page 1 (of 8)

 Group Assignment: **NONE**
 Field Master Assignment: **NONE**
 System Reference Number: **140**

 N/S Street Name: **Not Assigned**
 E/W Street Name: **Not Assigned**

 Last Database Change: **9/9/2019 5:41:52 PM**

Change Record					
Change	By	Date	Change	By	Date

Notes:

Manual Plan
 0 = Automatic
 1-9 = Plan 1-9
 14 = Free
 15 = Flash

Manual Offset
 0 = Automatic
 1 = Offset A
 2 = Offset B
 3 = Offset C

Drop Number	1	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	1	<C/0+0+2>
Area Address	124	<C/0+0+3>
QuicNet Channel	8017:10.151.192	(QuicNet)

Communication Addresses

Manual Plan		<C/0+A+1>
Manual Offset		<C/0+B+1>

Manual Selection

Red Revert	5.0	<F/1+0+F>
All Red Start	5.0	<F/1+C+0>

Start / Revert Times

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Exclusive Ped Phase
 (Outputs specified in Assignable
 Outputs at E/127+A+E & F)

		Phase							
Column Numbers ---->		1	2	3	4	5	6	7	8
Row	Phase Names ---->								
0	Ped Walk	0	0	0	0	0	0	0	0
1	Ped FDW	0	0	0	0	0	0	0	0
2	Min Green	0	20	10	0	0	20	0	10
3	Type 3 Disconnect	0	0	0	0	0	0	0	0
4	Added per Vehicle	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.0
5	Veh Extension	0.0	4.0	1.0	0.0	0.0	4.0	0.0	3.0
6	Max Gap	0.0	4.0	1.0	0.0	0.0	4.0	0.0	3.0
7	Min Gap	0.0	4.0	1.0	0.0	0.0	4.0	0.0	3.0
8	Max Limit	0	50	35	0	0	50	0	35
9	Max Limit 2	0	0	0	0	0	0	0	0
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0
B	Sequence To	0	0	0	0	0	0	0	0
C	Cond Serv Check	0	0	0	0	0	0	0	0
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	Yellow Change	0.0	5.9	5.9	0.0	0.0	5.9	5.9	5.9
F	Red Clear	0.0	2.0	1.1	0.0	0.0	2.0	1.1	1.1

Phase Timing - Bank 1

<C+0+F=1>

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	34	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	34	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing

<C+0+F=1>

	E
RR-1 Delay	0
RR-1 Clear	0
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	0
EV-D Clear	0
RR-2 Delay	0
RR-2 Clear	14
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing

	F	Row
Permit	23_6_8	0
Red Lock		1
Yellow Lock		2
Min Recall	2_6_	3
Ped Recall		4
View Set Peds	-----	5
Rest In Walk		6
Red Rest		7
Dual Entry	23_6_8	8
Max Recall		9
Soft Recall		A
Max 2		B
Cond. Service		C
Man Cntrl Calls		D
Yellow Start	2_6_	E
First Phases	3_8	F

Phase Functions

<C+0+F=1>

Appendix C

Base Year Traffic Operational Reports



Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

Base Year (2024) AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖	↖	↖		↖	↖	↖
Traffic Volume (vph)	22	312	126	35	338	29	75	105	31	12	104	40
Future Volume (vph)	22	312	126	35	338	29	75	105	31	12	104	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.957				0.850			0.966		0.959	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1456	1718	0	1703	1827	1509	1736	1729	0	1805	1735	0
Flt Permitted	0.543			0.483			0.658			0.663		
Satd. Flow (perm)	832	1718	0	866	1827	1509	1202	1729	0	1260	1735	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29				43			16			20
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	24%	7%	3%	6%	4%	7%	4%	5%	10%	0%	2%	13%
Adj. Flow (vph)	24	339	137	38	367	32	82	114	34	13	113	43
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	476	0	38	367	32	82	148	0	13	156	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	24.7	24.7		24.7	24.7	24.7	11.2	11.2		11.2	11.2	
Actuated g/C Ratio	0.56	0.56		0.56	0.56	0.56	0.26	0.26		0.26	0.26	
v/c Ratio	0.05	0.49		0.08	0.36	0.04	0.27	0.33		0.04	0.34	
Control Delay	8.0	10.8		8.2	9.7	2.6	18.4	16.7		15.4	16.5	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.0	10.8		8.2	9.7	2.6	18.4	16.7		15.4	16.5	
LOS	A	B		A	A	A	B	B		B	B	
Approach Delay		10.6			9.1			17.3			16.4	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

Base Year (2024) AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			A			B			B	
Queue Length 50th (m)	1.1	25.4		1.7	19.3	0.0	5.7	9.2		0.9	9.5	
Queue Length 95th (m)	4.5	54.7		6.2	40.6	2.8	16.9	24.5		4.5	25.2	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	823	1700		856	1807	1493	949	1369		995	1374	
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	0.03	0.28		0.04	0.20	0.02	0.09	0.11		0.01	0.11	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 43.8

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 12.0 Intersection LOS: B

Intersection Capacity Utilization 64.0% ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7


























HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

Base Year (2024) AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	312	126	35	338	29	75	105	31	12	104	40
Future Volume (veh/h)	22	312	126	35	338	29	75	105	31	12	104	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1544	1796	1856	1811	1841	1796	1841	1826	1752	1900	1870	1707
Adj Flow Rate, veh/h	24	339	137	38	367	32	82	114	34	13	113	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	24	7	3	6	4	7	4	5	10	0	2	13
Cap, veh/h	411	543	219	367	821	679	338	299	89	349	286	109
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	814	1216	492	889	1841	1522	1211	1351	403	1259	1291	491
Grp Volume(v), veh/h	24	0	476	38	367	32	82	0	148	13	0	156
Grp Sat Flow(s),veh/h/ln	814	0	1708	889	1841	1522	1211	0	1753	1259	0	1782
Q Serve(g_s), s	0.9	0.0	9.6	1.5	6.2	0.5	2.8	0.0	3.2	0.4	0.0	3.3
Cycle Q Clear(g_c), s	7.1	0.0	9.6	11.1	6.2	0.5	6.1	0.0	3.2	3.6	0.0	3.3
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.23	1.00		0.28
Lane Grp Cap(c), veh/h	411	0	762	367	821	679	338	0	388	349	0	395
V/C Ratio(X)	0.06	0.00	0.62	0.10	0.45	0.05	0.24	0.00	0.38	0.04	0.00	0.40
Avail Cap(c_a), veh/h	994	0	1985	1004	2139	1769	1016	0	1369	1053	0	1391
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.1	0.0	9.5	13.8	8.6	7.0	17.5	0.0	14.8	16.4	0.0	14.9
Incr Delay (d2), s/veh	0.1	0.0	1.2	0.2	0.5	0.0	0.4	0.0	0.6	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.0	0.5	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.1	0.0	10.7	14.0	9.1	7.1	17.9	0.0	15.5	16.4	0.0	15.1
LnGrp LOS	B	A	B	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	500			437			230			169		
Approach Delay, s/veh	10.8			9.4			16.3			15.2		
Approach LOS	B			A			B			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	27.9			16.9			27.9			16.9		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	11.6			5.6			13.1			8.1		
Green Ext Time (p_c), s	6.4			0.4			4.9			1.4		

Intersection Summary

HCM 6th Ctrl Delay 11.8

HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

Base Year (2024) PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖	↖	↖		↖	↖	↖
Traffic Volume (vph)	35	509	94	33	444	37	175	231	49	45	149	31
Future Volume (vph)	35	509	94	33	444	37	175	231	49	45	149	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.977				0.850		0.974			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1823	0	1805	1845	1615	1770	1835	0	1770	1755	0
Flt Permitted	0.424			0.271			0.634			0.501		
Satd. Flow (perm)	701	1823	0	515	1845	1615	1181	1835	0	933	1755	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		13				43		11			11	
Link Speed (k/h)	80			80			80			80		
Link Distance (m)	360.1			209.0			510.2			193.6		
Travel Time (s)	16.2			9.4			23.0			8.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	15%	2%	1%	0%	3%	0%	2%	1%	0%	2%	3%	17%
Adj. Flow (vph)	38	553	102	36	483	40	190	251	53	49	162	34
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	655	0	36	483	40	190	304	0	49	196	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	30.7	30.7		30.7	30.7	30.7	17.6	17.6		17.6	17.6	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.27	0.27		0.27	0.27	
v/c Ratio	0.11	0.75		0.15	0.55	0.05	0.59	0.60		0.19	0.40	
Control Delay	11.3	20.0		12.2	15.0	3.6	30.5	26.3		22.5	22.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	11.3	20.0		12.2	15.0	3.6	30.5	26.3		22.5	22.2	
LOS	B	C		B	B	A	C	C		C	C	
Approach Delay		19.5			14.0			27.9			22.3	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

Base Year (2024) PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			C			C	
Queue Length 50th (m)	2.3	55.7		2.2	36.6	0.0	18.4	28.3		4.2	16.8	
Queue Length 95th (m)	9.1	129.2		9.1	85.0	4.7	52.4	72.7		16.0	46.7	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	583	1518		428	1534	1350	691	1079		546	1032	
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	0.07	0.43		0.08	0.31	0.03	0.27	0.28		0.09	0.19	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 64.3

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 20.4

Intersection LOS: C

Intersection Capacity Utilization 74.2%

ICU Level of Service D
























Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7



HCM 6th Signalized Intersection Summary
1: Wellington Road 29 & Highway 7

Base Year (2024) PM Peak Hour
(230251) 8075 Highway 7, Guelph-Eramosa TIB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	509	94	33	444	37	175	231	49	45	149	31
Future Volume (veh/h)	35	509	94	33	444	37	175	231	49	45	149	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1870	1885	1900	1856	1900	1870	1885	1900	1870	1856	1648
Adj Flow Rate, veh/h	38	553	102	36	483	40	190	251	53	49	162	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	15	2	1	0	3	0	2	1	0	2	3	17
Cap, veh/h	329	717	132	241	866	751	374	464	98	291	457	96
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	789	1536	283	790	1856	1610	1187	1509	319	1075	1487	312
Grp Volume(v), veh/h	38	0	655	36	483	40	190	0	304	49	0	196
Grp Sat Flow(s),veh/h/ln	789	0	1819	790	1856	1610	1187	0	1828	1075	0	1799
Q Serve(g_s), s	2.4	0.0	19.8	2.6	12.4	0.9	9.8	0.0	9.1	2.6	0.0	5.6
Cycle Q Clear(g_c), s	14.8	0.0	19.8	22.4	12.4	0.9	15.3	0.0	9.1	11.7	0.0	5.6
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.17	1.00		0.17
Lane Grp Cap(c), veh/h	329	0	849	241	866	751	374	0	562	291	0	553
V/C Ratio(X)	0.12	0.00	0.77	0.15	0.56	0.05	0.51	0.00	0.54	0.17	0.00	0.35
Avail Cap(c_a), veh/h	584	0	1437	496	1466	1272	639	0	970	531	0	955
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.0	0.0	14.7	24.0	12.7	9.6	23.7	0.0	19.0	23.8	0.0	17.7
Incr Delay (d2), s/veh	0.2	0.0	2.2	0.4	0.8	0.0	1.1	0.0	0.8	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	0.9	0.3	0.3	0.0	1.4	0.0	1.1	0.4	0.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.2	0.0	16.8	24.4	13.5	9.7	24.8	0.0	19.8	23.9	0.0	17.9
LnGrp LOS	B	A	B	C	B	A	C	A	B	C	A	B
Approach Vol, veh/h	693			559			494			245		
Approach Delay, s/veh	16.9			13.9			21.7			19.1		
Approach LOS	B			B			C			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	38.7			27.3			38.7			27.3		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	21.8			13.7			24.4			17.3		
Green Ext Time (p_c), s	9.0			0.6			6.2			2.9		

Intersection Summary

HCM 6th Ctrl Delay	17.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Appendix D

Background Traffic Operational Reports



Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Background AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖	↖	↖		↖	↖	↖
Traffic Volume (vph)	22	318	129	36	345	30	77	107	32	12	106	41
Future Volume (vph)	22	318	129	36	345	30	77	107	32	12	106	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.957				0.850		0.965			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1456	1718	0	1703	1827	1509	1736	1727	0	1805	1732	0
Flt Permitted	0.539			0.449			0.656			0.661		
Satd. Flow (perm)	826	1718	0	805	1827	1509	1198	1727	0	1256	1732	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		29				43		16			21	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	24%	7%	3%	6%	4%	7%	4%	5%	10%	0%	2%	13%
Adj. Flow (vph)	24	346	140	39	375	33	84	116	35	13	115	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	486	0	39	375	33	84	151	0	13	160	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	21.6	21.6		21.6	21.6	21.6	10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.45	0.45		0.45	0.45	0.45	0.23	0.23		0.23	0.23	
v/c Ratio	0.06	0.61		0.11	0.45	0.05	0.31	0.37		0.05	0.39	
Control Delay	8.1	13.2		8.6	11.1	2.7	19.3	17.4		15.7	17.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.1	13.2		8.6	11.1	2.7	19.3	17.4		15.7	17.1	
LOS	A	B		A	B	A	B	B		B	B	
Approach Delay		13.0			10.3			18.1			17.0	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Background AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)	1.1	26.2		1.7	19.9	0.0	5.8	9.4		0.9	9.7	
Queue Length 95th (m)	4.5	56.9		6.4	41.9	2.9	17.5	25.2		4.6	26.0	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	814	1694		793	1801	1488	887	1283		931	1288	
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	0.03	0.29		0.05	0.21	0.02	0.09	0.12		0.01	0.12	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 47.6

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 13.5

Intersection LOS: B

Intersection Capacity Utilization 64.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7


























HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2025 Background AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	318	129	36	345	30	77	107	32	12	106	41
Future Volume (veh/h)	22	318	129	36	345	30	77	107	32	12	106	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1544	1796	1856	1811	1841	1796	1841	1826	1752	1900	1870	1707
Adj Flow Rate, veh/h	24	346	140	39	375	33	84	116	35	13	115	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	24	7	3	6	4	7	4	5	10	0	2	13
Cap, veh/h	406	542	219	359	821	679	335	298	90	347	284	111
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	807	1216	492	881	1841	1522	1207	1346	406	1256	1280	501
Grp Volume(v), veh/h	24	0	486	39	375	33	84	0	151	13	0	160
Grp Sat Flow(s),veh/h/ln	807	0	1708	881	1841	1522	1207	0	1753	1256	0	1780
Q Serve(g_s), s	1.0	0.0	9.9	1.6	6.4	0.6	2.9	0.0	3.3	0.4	0.0	3.4
Cycle Q Clear(g_c), s	7.3	0.0	9.9	11.5	6.4	0.6	6.3	0.0	3.3	3.7	0.0	3.4
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.23	1.00		0.28
Lane Grp Cap(c), veh/h	406	0	762	359	821	679	335	0	388	347	0	395
V/C Ratio(X)	0.06	0.00	0.64	0.11	0.46	0.05	0.25	0.00	0.39	0.04	0.00	0.41
Avail Cap(c_a), veh/h	984	0	1984	990	2139	1769	1010	0	1368	1049	0	1390
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.2	0.0	9.6	14.1	8.6	7.0	17.6	0.0	14.9	16.4	0.0	14.9
Incr Delay (d2), s/veh	0.1	0.0	1.3	0.2	0.6	0.0	0.4	0.0	0.6	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.0	0.5	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.3	0.0	10.9	14.3	9.2	7.1	18.0	0.0	15.5	16.5	0.0	15.2
LnGrp LOS	B	A	B	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	510			447			235			173		
Approach Delay, s/veh	10.9			9.5			16.4			15.3		
Approach LOS	B			A			B			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	27.9			16.9			27.9			16.9		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	11.9			5.7			13.5			8.3		
Green Ext Time (p_c), s	6.6			0.4			5.0			1.4		

Intersection Summary

HCM 6th Ctrl Delay 11.9

HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Background PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖	↖	↖		↖	↖	↖
Traffic Volume (vph)	36	519	96	34	453	38	179	236	50	46	152	32
Future Volume (vph)	36	519	96	34	453	38	179	236	50	46	152	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.977				0.850		0.974			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1823	0	1805	1845	1615	1770	1835	0	1770	1755	0
Flt Permitted	0.415			0.260			0.632			0.486		
Satd. Flow (perm)	686	1823	0	494	1845	1615	1177	1835	0	905	1755	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		13				43		11			11	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	15%	2%	1%	0%	3%	0%	2%	1%	0%	2%	3%	17%
Adj. Flow (vph)	39	564	104	37	492	41	195	257	54	50	165	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	668	0	37	492	41	195	311	0	50	200	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	31.6	31.6		31.6	31.6	31.6	18.1	18.1		18.1	18.1	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.28	0.28		0.28	0.28	
v/c Ratio	0.12	0.76		0.16	0.56	0.05	0.60	0.61		0.20	0.41	
Control Delay	11.6	20.7		12.7	15.4	3.7	31.3	26.9		23.0	22.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	11.6	20.7		12.7	15.4	3.7	31.3	26.9		23.0	22.6	
LOS	B	C		B	B	A	C	C		C	C	
Approach Delay		20.2			14.4			28.6			22.7	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Background PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↖	↗	←	→	↖	↗	←	→	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (m)	2.4	58.8		2.3	38.3	0.0	19.5	29.9		4.4	17.7	
Queue Length 95th (m)	9.5	135.9		9.5	88.7	4.9	54.9	75.6		16.6	48.3	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	562	1496		404	1512	1331	676	1059		520	1013	
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	0.07	0.45		0.09	0.33	0.03	0.29	0.29		0.10	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 65.8

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 21.0

Intersection LOS: C

Intersection Capacity Utilization 75.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7


























HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2025 Background PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	519	96	34	453	38	179	236	50	46	152	32
Future Volume (veh/h)	36	519	96	34	453	38	179	236	50	46	152	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1870	1885	1900	1856	1900	1870	1885	1900	1870	1856	1648
Adj Flow Rate, veh/h	39	564	104	37	492	41	195	257	54	50	165	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	15	2	1	0	3	0	2	1	0	2	3	17
Cap, veh/h	323	722	133	232	872	757	372	471	99	288	463	98
Arrive On Green	0.47	0.47	0.47	0.47	0.47	0.47	0.31	0.31	0.31	0.31	0.31	0.31
Sat Flow, veh/h	781	1536	283	781	1856	1610	1182	1511	317	1068	1484	315
Grp Volume(v), veh/h	39	0	668	37	492	41	195	0	311	50	0	200
Grp Sat Flow(s),veh/h/ln	781	0	1819	781	1856	1610	1182	0	1828	1068	0	1799
Q Serve(g_s), s	2.6	0.0	21.0	2.8	13.0	0.9	10.4	0.0	9.6	2.8	0.0	5.9
Cycle Q Clear(g_c), s	15.6	0.0	21.0	23.8	13.0	0.9	16.3	0.0	9.6	12.4	0.0	5.9
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.17	1.00		0.17
Lane Grp Cap(c), veh/h	323	0	855	232	872	757	372	0	570	288	0	561
V/C Ratio(X)	0.12	0.00	0.78	0.16	0.56	0.05	0.52	0.00	0.55	0.17	0.00	0.36
Avail Cap(c_a), veh/h	553	0	1389	462	1417	1229	610	0	938	503	0	923
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.7	0.0	15.1	25.1	13.0	9.8	24.5	0.0	19.5	24.6	0.0	18.2
Incr Delay (d2), s/veh	0.2	0.0	2.3	0.5	0.8	0.0	1.1	0.0	0.8	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.2	0.0	1.0	0.4	0.4	0.0	1.6	0.0	1.4	0.4	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	18.9	0.0	17.4	25.6	13.9	9.9	25.6	0.0	20.3	24.7	0.0	18.3
LnGrp LOS	B	A	B	C	B	A	C	A	C	C	A	B
Approach Vol, veh/h	707			570			506			250		
Approach Delay, s/veh	17.5			14.3			22.4			19.6		
Approach LOS	B			B			C			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	40.0			28.3			40.0			28.3		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	23.0			14.4			25.8			18.3		
Green Ext Time (p_c), s	9.1			0.6			6.2			3.0		

Intersection Summary

HCM 6th Ctrl Delay 18.1

HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Background AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰		↰	↰	↰
Traffic Volume (vph)	25	351	142	39	381	33	84	118	35	14	117	45
Future Volume (vph)	25	351	142	39	381	33	84	118	35	14	117	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.957				0.850		0.966			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1456	1718	0	1703	1827	1509	1736	1729	0	1805	1732	0
Flt Permitted	0.520			0.398			0.646			0.652		
Satd. Flow (perm)	797	1718	0	713	1827	1509	1180	1729	0	1239	1732	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		29				43		16			21	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	24%	7%	3%	6%	4%	7%	4%	5%	10%	0%	2%	13%
Adj. Flow (vph)	27	382	154	42	414	36	91	128	38	15	127	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	536	0	42	414	36	91	166	0	15	176	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	23.0	23.0		23.0	23.0	23.0	11.5	11.5		11.5	11.5	
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46	0.23	0.23		0.23	0.23	
v/c Ratio	0.07	0.66		0.13	0.49	0.05	0.33	0.40		0.05	0.42	
Control Delay	8.2	14.5		8.9	11.7	2.8	21.0	18.8		16.9	18.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.2	14.5		8.9	11.7	2.8	21.0	18.8		16.9	18.7	
LOS	A	B		A	B	A	C	B		B	B	
Approach Delay		14.2			10.8			19.6			18.5	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Background AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)	1.2	30.4		1.9	22.5	0.0	6.4	10.6		1.0	11.0	
Queue Length 95th (m)	5.1	68.4		7.2	49.2	3.3	20.4	30.1		5.4	31.2	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	770	1661		689	1766	1460	845	1244		888	1247	
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	0.04	0.32		0.06	0.23	0.02	0.11	0.13		0.02	0.14	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 49.6

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 14.5

Intersection LOS: B

Intersection Capacity Utilization 67.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7


























HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2030 Background AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	351	142	39	381	33	84	118	35	14	117	45
Future Volume (veh/h)	25	351	142	39	381	33	84	118	35	14	117	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1544	1796	1856	1811	1841	1796	1841	1826	1752	1900	1870	1707
Adj Flow Rate, veh/h	27	382	154	42	414	36	91	128	38	15	127	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	24	7	3	6	4	7	4	5	10	0	2	13
Cap, veh/h	382	552	222	324	834	690	327	312	93	339	296	114
Arrive On Green	0.45	0.45	0.45	0.45	0.45	0.45	0.23	0.23	0.23	0.23	0.23	0.23
Sat Flow, veh/h	777	1217	491	841	1841	1522	1189	1352	401	1239	1285	496
Grp Volume(v), veh/h	27	0	536	42	414	36	91	0	166	15	0	176
Grp Sat Flow(s),veh/h/ln	777	0	1708	841	1841	1522	1189	0	1754	1239	0	1781
Q Serve(g_s), s	1.2	0.0	11.8	2.0	7.5	0.6	3.3	0.0	3.8	0.5	0.0	4.0
Cycle Q Clear(g_c), s	8.7	0.0	11.8	13.8	7.5	0.6	7.3	0.0	3.8	4.3	0.0	4.0
Prop In Lane	1.00		0.29	1.00		1.00	1.00		0.23	1.00		0.28
Lane Grp Cap(c), veh/h	382	0	774	324	834	690	327	0	404	339	0	411
V/C Ratio(X)	0.07	0.00	0.69	0.13	0.50	0.05	0.28	0.00	0.41	0.04	0.00	0.43
Avail Cap(c_a), veh/h	888	0	1887	872	2034	1682	935	0	1302	973	0	1322
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	0.0	10.3	15.7	9.1	7.2	18.6	0.0	15.4	17.2	0.0	15.5
Incr Delay (d2), s/veh	0.1	0.0	1.6	0.3	0.7	0.0	0.5	0.0	0.7	0.0	0.0	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.0	0.6	0.0	0.3	0.0	0.1	0.0	0.1	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.3	0.0	11.9	16.0	9.7	7.3	19.1	0.0	16.1	17.3	0.0	15.7
LnGrp LOS	B	A	B	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	563			492			257			191		
Approach Delay, s/veh	11.9			10.1			17.1			15.9		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	29.3			17.9			29.3			17.9		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	13.8			6.3			15.8			9.3		
Green Ext Time (p_c), s	7.4			0.5			5.6			1.6		

Intersection Summary

HCM 6th Ctrl Delay 12.7

HCM 6th LOS B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Background PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖	↖	↖		↖	↖	↖
Traffic Volume (vph)	39	573	106	37	500	42	197	260	55	51	168	35
Future Volume (vph)	39	573	106	37	500	42	197	260	55	51	168	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.977				0.850		0.974			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1823	0	1805	1845	1615	1770	1835	0	1770	1756	0
Flt Permitted	0.362			0.200			0.619			0.427		
Satd. Flow (perm)	598	1823	0	380	1845	1615	1153	1835	0	795	1756	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		13				46		11			11	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	15%	2%	1%	0%	3%	0%	2%	1%	0%	2%	3%	17%
Adj. Flow (vph)	42	623	115	40	543	46	214	283	60	55	183	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	738	0	40	543	46	214	343	0	55	221	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	35.4	35.4		35.4	35.4	35.4	21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.29	0.29		0.29	0.29	
v/c Ratio	0.14	0.82		0.22	0.60	0.06	0.64	0.64		0.24	0.43	
Control Delay	13.1	25.5		15.7	17.5	4.0	34.1	28.9		25.1	24.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.1	25.5		15.7	17.5	4.0	34.1	28.9		25.1	24.1	
LOS	B	C		B	B	A	C	C		C	C	
Approach Delay		24.8			16.4			30.9			24.3	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Background PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (m)	3.0	79.6		2.9	50.5	0.0	25.9	40.0		5.8	23.5	
Queue Length 95th (m)	11.1	171.8		11.8	108.5	5.6	60.3	84.0		18.1	52.9	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	448	1370		285	1383	1222	602	964		415	923	
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	0.09	0.54		0.14	0.39	0.04	0.36	0.36		0.13	0.24	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 72.6

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 23.9

Intersection LOS: C

Intersection Capacity Utilization 80.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7


























HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2030 Background PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	573	106	37	500	42	197	260	55	51	168	35
Future Volume (veh/h)	39	573	106	37	500	42	197	260	55	51	168	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1870	1885	1900	1856	1900	1870	1885	1900	1870	1856	1648
Adj Flow Rate, veh/h	42	623	115	40	543	46	214	283	60	55	183	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	15	2	1	0	3	0	2	1	0	2	3	17
Cap, veh/h	297	756	140	195	913	793	356	491	104	264	486	101
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	742	1536	283	732	1856	1610	1160	1508	320	1038	1490	309
Grp Volume(v), veh/h	42	0	738	40	543	46	214	0	343	55	0	221
Grp Sat Flow(s),veh/h/ln	742	0	1819	732	1856	1610	1160	0	1828	1038	0	1800
Q Serve(g_s), s	3.5	0.0	28.4	4.0	17.2	1.2	14.2	0.0	12.8	3.8	0.0	7.7
Cycle Q Clear(g_c), s	20.7	0.0	28.4	32.4	17.2	1.2	22.0	0.0	12.8	16.6	0.0	7.7
Prop In Lane	1.00		0.16	1.00		1.00	1.00		0.17	1.00		0.17
Lane Grp Cap(c), veh/h	297	0	896	195	913	793	356	0	595	264	0	586
V/C Ratio(X)	0.14	0.00	0.82	0.21	0.59	0.06	0.60	0.00	0.58	0.21	0.00	0.38
Avail Cap(c_a), veh/h	404	0	1157	300	1180	1024	474	0	781	370	0	769
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	0.0	17.8	31.6	14.9	10.9	29.7	0.0	22.9	29.8	0.0	21.2
Incr Delay (d2), s/veh	0.3	0.0	4.4	0.7	0.9	0.0	1.6	0.0	0.9	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.4	0.0	2.5	0.7	0.8	0.0	3.2	0.0	3.3	0.8	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.7	0.0	22.2	32.3	15.8	10.9	31.3	0.0	23.8	29.9	0.0	21.4
LnGrp LOS	C	A	C	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h	780			629			557			276		
Approach Delay, s/veh	22.2			16.5			26.7			23.1		
Approach LOS	C			B			C			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	48.2			33.7			48.2			33.7		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	30.4			18.6			34.4			24.0		
Green Ext Time (p_c), s	9.1			0.6			5.9			2.7		

Intersection Summary

HCM 6th Ctrl Delay 21.8

HCM 6th LOS C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Appendix E

Total Traffic Operational Reports



Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	↙	↘	→	↙	↘	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↙	↘		↙	↘	↙	↘	↘		↙	↘		
Traffic Volume (vph)	22	318	135	46	345	30	84	107	43	12	106	41	
Future Volume (vph)	22	318	135	46	345	30	84	107	43	12	106	41	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0	
Storage Lanes	1		0	1		1	1		0	1		0	
Taper Length (m)	100.0			100.0			100.0			100.0			
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		0.955				0.850		0.957			0.958		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1456	1715	0	1703	1827	1509	1736	1708	0	1805	1732	0	
Flt Permitted	0.539			0.441			0.656			0.654			
Satd. Flow (perm)	826	1715	0	790	1827	1509	1198	1708	0	1243	1732	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		31				43		22			21		
Link Speed (k/h)		80			80			80			80		
Link Distance (m)		360.1			209.0			510.2			193.6		
Travel Time (s)		16.2			9.4			23.0			8.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	24%	7%	3%	6%	4%	7%	4%	5%	10%	0%	2%	13%	
Adj. Flow (vph)	24	346	147	50	375	33	91	116	47	13	115	45	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	24	493	0	50	375	33	91	163	0	13	160	0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA		
Protected Phases		2			6			8			4		
Permitted Phases	2			6		6	8			4			
Detector Phase	2	2		6	6	6	8	8		4	4		
Switch Phase													
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0		
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5		
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0		
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%		
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0		
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9		
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1		
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0		
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0		
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None		
Act Effect Green (s)	21.9	21.9		21.9	21.9	21.9	11.1	11.1		11.1	11.1		
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46	0.23	0.23		0.23	0.23		
v/c Ratio	0.06	0.62		0.14	0.45	0.05	0.33	0.40		0.05	0.38		
Control Delay	8.2	13.5		9.1	11.2	2.7	19.8	17.3		15.8	17.2		
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0		
Total Delay	8.2	13.5		9.1	11.2	2.7	19.8	17.3		15.8	17.2		
LOS	A	B		A	B	A	B	B		B	B		
Approach Delay		13.2			10.4			18.2			17.1		

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	↙	↘	→	↙	↘	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Approach LOS		B			B			B			B		
Queue Length 50th (m)	1.1	26.7		2.3	19.9	0.0	6.3	9.9		0.9	9.7		
Queue Length 95th (m)	4.6	59.4		8.0	42.8	3.0	19.0	26.9		4.6	26.4		
Internal Link Dist (m)		336.1			185.0			486.2			169.6		
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0			
Base Capacity (vph)	810	1683		775	1792	1481	880	1261		913	1278		
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	0.03	0.29		0.06	0.21	0.02	0.10	0.13		0.01	0.13		

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 48.1

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.62

Intersection Signal Delay: 13.7

Intersection LOS: B

Intersection Capacity Utilization 73.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7



HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2025 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱	↲	↰	↱	↲	↰	↱	↲	↰	↱	↲
Traffic Volume (veh/h)	22	318	135	46	345	30	84	107	43	12	106	41
Future Volume (veh/h)	22	318	135	46	345	30	84	107	43	12	106	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1544	1796	1856	1811	1841	1796	1841	1826	1752	1900	1870	1707
Adj Flow Rate, veh/h	24	346	147	50	375	33	91	116	47	13	115	45
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	24	7	3	6	4	7	4	5	10	0	2	13
Cap, veh/h	404	532	226	351	818	677	339	277	112	339	287	112
Arrive On Green	0.44	0.44	0.44	0.44	0.44	0.44	0.22	0.22	0.22	0.22	0.22	0.22
Sat Flow, veh/h	807	1196	508	875	1841	1522	1207	1235	501	1242	1280	501
Grp Volume(v), veh/h	24	0	493	50	375	33	91	0	163	13	0	160
Grp Sat Flow(s), veh/h/ln	807	0	1705	875	1841	1522	1207	0	1736	1242	0	1780
Q Serve(g_s), s	1.0	0.0	10.2	2.1	6.4	0.6	3.1	0.0	3.6	0.4	0.0	3.4
Cycle Q Clear(g_c), s	7.4	0.0	10.2	12.3	6.4	0.6	6.6	0.0	3.6	4.0	0.0	3.4
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.29	1.00		0.28
Lane Grp Cap(c), veh/h	404	0	758	351	818	677	339	0	390	339	0	400
V/C Ratio(X)	0.06	0.00	0.65	0.14	0.46	0.05	0.27	0.00	0.42	0.04	0.00	0.40
Avail Cap(c_a), veh/h	980	0	1974	975	2131	1762	1006	0	1350	1026	0	1385
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.3	0.0	9.8	14.6	8.7	7.1	17.7	0.0	14.9	16.7	0.0	14.9
Incr Delay (d2), s/veh	0.1	0.0	1.4	0.3	0.6	0.0	0.4	0.0	0.7	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.0	0.5	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.4	0.0	11.1	14.8	9.3	7.1	18.1	0.0	15.7	16.7	0.0	15.1
LnGrp LOS	B	A	B	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h		517			458			254			173	
Approach Delay, s/veh		11.1			9.7			16.5			15.2	
Approach LOS		B			A			B			B	
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	27.9		17.1		27.9		17.1					
Change Period (Y+Rc), s	7.9		* 7		7.9		* 7					
Max Green Setting (Gmax), s	52.1		* 35		52.1		* 35					
Max Q Clear Time (g_c+I1), s	12.2		6.0		14.3		8.6					
Green Ext Time (p_c), s	6.7		0.4		5.1		1.6					

Intersection Summary												
HCM 6th Ctrl Delay		12.2										
HCM 6th LOS		B										

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

2: Wellington Road 29 & Site Driveway

2025 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↱	↱
Traffic Volume (vph)	18	0	0	215	270	16
Future Volume (vph)	18	0	0	215	270	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.993	
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	1863	1850	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	1863	1850	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	204.3			172.4	510.2	
Travel Time (s)	14.7			7.8	23.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	0	0	234	293	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	0	234	310	0
Sign Control	Stop			Free	Free	

Intersection Summary					
Area Type:	Other				
Control Type:	Unsignalized				
Intersection Capacity Utilization 25.2%	ICU Level of Service A				
Analysis Period (min) 15					

HCM 6th TWSC

2: Wellington Road 29 & Site Driveway

2025 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	0	0	215	270	16
Future Vol, veh/h	18	0	0	215	270	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	0	0	234	293	17
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	536	302	310	0	-	0
Stage 1	302	-	-	-	-	-
Stage 2	234	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	505	738	1250	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	505	738	1250	-	-	-
Mov Cap-2 Maneuver	505	-	-	-	-	-
Stage 1	750	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12.4	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1250	-	505	-	-	
HCM Lane V/C Ratio	-	-	0.039	-	-	
HCM Control Delay (s)	0	-	12.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰		↰	↰	↰
Traffic Volume (vph)	36	519	111	56	453	38	201	236	83	46	152	32
Future Volume (vph)	36	519	111	56	453	38	201	236	83	46	152	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.974				0.850		0.961			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1817	0	1805	1845	1615	1770	1812	0	1770	1755	0
Flt Permitted	0.407			0.239			0.632			0.430		
Satd. Flow (perm)	672	1817	0	454	1845	1615	1177	1812	0	801	1755	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				43		19			11	
Link Speed (k/h)	80			80			80			80		
Link Distance (m)	360.1			209.0			510.2			193.6		
Travel Time (s)	16.2			9.4			23.0			8.7		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	15%	2%	1%	0%	3%	0%	2%	1%	0%	2%	3%	17%
Adj. Flow (vph)	39	564	121	61	492	41	218	257	90	50	165	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	39	685	0	61	492	41	218	347	0	50	200	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	33.0	33.0		33.0	33.0	33.0	20.0	20.0		20.0	20.0	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.29	0.29		0.29	0.29	
v/c Ratio	0.12	0.78		0.28	0.56	0.05	0.64	0.65		0.22	0.39	
Control Delay	12.6	22.9		16.5	16.4	3.9	32.8	27.6		23.6	22.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	12.6	22.9		16.5	16.4	3.9	32.8	27.6		23.6	22.4	
LOS	B	C		B	B	A	C	C		C	C	
Approach Delay		22.3			15.5			29.6			22.7	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2025 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (m)	2.6	65.9		4.4	41.3	0.0	23.6	35.5		4.7	18.7	
Queue Length 95th (m)	10.2	151.8		16.5	95.2	5.1	61.1	83.8		16.8	47.9	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	529	1434		357	1453	1281	646	1004		439	969	
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	0.07	0.48		0.17	0.34	0.03	0.34	0.35		0.11	0.21	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 69.1

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 22.4

Intersection LOS: C

Intersection Capacity Utilization 90.6%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7



HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2025 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	
Traffic Volume (veh/h)	36	519	111	56	453	38	201	236	83	46	152	32
Future Volume (veh/h)	36	519	111	56	453	38	201	236	83	46	152	32
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1870	1885	1900	1856	1900	1870	1885	1900	1870	1856	1648
Adj Flow Rate, veh/h	39	564	121	61	492	41	218	257	90	50	165	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	15	2	1	0	3	0	2	1	0	2	3	17
Cap, veh/h	327	725	155	226	901	782	373	430	150	259	478	101
Arrive On Green	0.49	0.49	0.49	0.49	0.49	0.49	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	781	1493	320	769	1856	1610	1182	1334	467	1034	1484	315
Grp Volume(v), veh/h	39	0	685	61	492	41	218	0	347	50	0	200
Grp Sat Flow(s), veh/h/ln	781	0	1813	769	1856	1610	1182	0	1801	1034	0	1799
Q Serve(g_s), s	2.8	0.0	24.2	5.5	14.4	1.0	13.4	0.0	12.5	3.3	0.0	6.6
Cycle Q Clear(g_c), s	17.2	0.0	24.2	29.7	14.4	1.0	19.9	0.0	12.5	15.8	0.0	6.6
Prop In Lane	1.00		0.18	1.00		1.00	1.00		0.26	1.00		0.17
Lane Grp Cap(c), veh/h	327	0	880	226	901	782	373	0	580	259	0	579
V/C Ratio(X)	0.12	0.00	0.78	0.27	0.55	0.05	0.58	0.00	0.60	0.19	0.00	0.35
Avail Cap(c_a), veh/h	474	0	1219	370	1248	1083	527	0	814	393	0	813
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	16.5	28.8	13.9	10.5	27.6	0.0	22.0	28.7	0.0	20.0
Incr Delay (d2), s/veh	0.2	0.0	2.7	0.9	0.7	0.0	1.4	0.0	1.0	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.3	0.0	1.2	0.9	0.3	0.0	2.7	0.0	2.8	0.7	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.2	0.0	19.2	29.7	14.7	10.6	29.1	0.0	23.0	28.8	0.0	20.2
LnGrp LOS	C	A	B	C	B	B	C	A	C	C	A	C
Approach Vol, veh/h	724			594			565			250		
Approach Delay, s/veh	19.3			15.9			25.4			21.9		
Approach LOS	B			B			C			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	45.5			31.9			45.5			31.9		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	26.2			17.8			31.7			21.9		
Green Ext Time (p_c), s	9.0			0.6			5.9			3.0		

Intersection Summary												
HCM 6th Ctrl Delay	20.3											
HCM 6th LOS	C											

Notes










* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

2: Wellington Road 29 & Site Driveway

2025 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	55	0	0	464	282	37
Future Volume (vph)	55	0	0	464	282	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.984					
Fit Protected	0.950					
Satd. Flow (prot)	1770	0	0	1863	1833	0
Fit Permitted	0.950					
Satd. Flow (perm)	1770	0	0	1863	1833	0
Link Speed (k/h)	50			80	80	
Link Distance (m)	204.3			172.4	510.2	
Travel Time (s)	14.7			7.8	23.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	0	0	504	307	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	60	0	0	504	347	0
Sign Control	Stop			Free	Free	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 34.4%	ICU Level of Service A											
Analysis Period (min) 15												

HCM 6th TWSC

2: Wellington Road 29 & Site Driveway

2025 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	55	0	0	464	282	37
Future Vol, veh/h	55	0	0	464	282	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	0	0	504	307	40
Major/Minor						
	Minor2	Major1	Major2			
Conflicting Flow All	831	327	347	0	-	0
Stage 1	327	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	340	714	1212	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	340	714	1212	-	-	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Approach						
	EB	NB	SB			
HCM Control Delay, s	17.8	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt						
	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1212	-	340	-	-	
HCM Lane V/C Ratio	-	-	0.176	-	-	
HCM Control Delay (s)	0	-	17.8	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.6	-	-	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰		↰	↰	↰
Traffic Volume (vph)	25	351	148	49	381	33	91	118	46	14	117	45
Future Volume (vph)	25	351	148	49	381	33	91	118	46	14	117	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.956				0.850		0.958			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1456	1717	0	1703	1827	1509	1736	1711	0	1805	1732	0
Flt Permitted	0.518			0.390			0.646			0.645		
Satd. Flow (perm)	794	1717	0	699	1827	1509	1180	1711	0	1226	1732	0
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		30				43		21			21	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	24%	7%	3%	6%	4%	7%	4%	5%	10%	0%	2%	13%
Adj. Flow (vph)	27	382	161	53	414	36	99	128	50	15	127	49
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	543	0	53	414	36	99	178	0	15	176	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	23.4	23.4		23.4	23.4	23.4	11.8	11.8		11.8	11.8	
Actuated g/C Ratio	0.46	0.46		0.46	0.46	0.46	0.23	0.23		0.23	0.23	
v/c Ratio	0.07	0.67		0.16	0.49	0.05	0.36	0.43		0.05	0.42	
Control Delay	8.4	14.8		9.6	11.8	2.8	21.6	18.9		17.1	18.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	8.4	14.8		9.6	11.8	2.8	21.6	18.9		17.1	18.7	
LOS	A	B		A	B	A	C	B		B	B	
Approach Delay		14.5			10.9			19.9			18.6	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			B			B	
Queue Length 50th (m)	1.2	31.6		2.4	22.9	0.0	7.1	11.4		1.0	11.2	
Queue Length 95th (m)	5.2	71.6		8.9	50.6	3.3	22.2	32.2		5.6	31.7	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	763	1652		672	1757	1453	835	1217		867	1232	
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	0.04	0.33		0.08	0.24	0.02	0.12	0.15		0.02	0.14	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 50.4

Natural Cycle: 55

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.67

Intersection Signal Delay: 14.8

Intersection LOS: B

Intersection Capacity Utilization 76.3%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7



HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2030 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↙	↘		↙	↘	↙	↘	↘		↙	↘	
Traffic Volume (veh/h)	25	351	148	49	381	33	91	118	46	14	117	45
Future Volume (veh/h)	25	351	148	49	381	33	91	118	46	14	117	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1544	1796	1856	1811	1841	1796	1841	1826	1752	1900	1870	1707
Adj Flow Rate, veh/h	27	382	161	53	414	36	99	128	50	15	127	49
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	24	7	3	6	4	7	4	5	10	0	2	13
Cap, veh/h	383	554	233	322	850	703	327	295	115	328	303	117
Arrive On Green	0.46	0.46	0.46	0.46	0.46	0.46	0.24	0.24	0.24	0.24	0.24	0.24
Sat Flow, veh/h	777	1200	506	836	1841	1522	1189	1250	488	1225	1285	496
Grp Volume(v), veh/h	27	0	543	53	414	36	99	0	178	15	0	176
Grp Sat Flow(s), veh/h/ln	777	0	1705	836	1841	1522	1189	0	1738	1225	0	1781
Q Serve(g_s), s	1.2	0.0	12.4	2.6	7.7	0.6	3.8	0.0	4.3	0.5	0.0	4.1
Cycle Q Clear(g_c), s	8.9	0.0	12.4	15.0	7.7	0.6	7.9	0.0	4.3	4.8	0.0	4.1
Prop In Lane	1.00		0.30	1.00		1.00	1.00		0.28	1.00		0.28
Lane Grp Cap(c), veh/h	383	0	787	322	850	703	327	0	410	328	0	420
V/C Ratio(X)	0.07	0.00	0.69	0.16	0.49	0.05	0.30	0.00	0.43	0.05	0.00	0.42
Avail Cap(c_a), veh/h	846	0	1802	819	1946	1609	891	0	1234	909	0	1265
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.3	0.0	10.5	16.4	9.2	7.3	19.3	0.0	16.0	18.1	0.0	16.0
Incr Delay (d2), s/veh	0.1	0.0	1.5	0.3	0.6	0.0	0.5	0.0	0.7	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.0	0.0	0.6	0.1	0.3	0.0	0.1	0.0	0.1	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.4	0.0	12.0	16.8	9.8	7.4	19.8	0.0	16.8	18.1	0.0	16.2
LnGrp LOS	B	A	B	B	A	A	B	A	B	B	A	B
Approach Vol, veh/h	570			503			277			191		
Approach Delay, s/veh	12.0			10.4			17.9			16.4		
Approach LOS	B			B			B			B		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	30.7			18.6			30.7			18.6		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	14.4			6.8			17.0			9.9		
Green Ext Time (p_c), s	7.5			0.5			5.7			1.7		

Intersection Summary

HCM 6th Ctrl Delay	13.1
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

2: Wellington Road 29 & Site Driveway

2030 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	↘
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙			↘	↘	
Traffic Volume (vph)	18	0	0	238	298	16
Future Volume (vph)	18	0	0	238	298	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.993					
Flt Protected	0.950					
Satd. Flow (prot)	1770	0	0	1863	1850	0
Flt Permitted	0.950					
Satd. Flow (perm)	1770	0	0	1863	1850	0
Link Speed (k/h)	50					
Link Distance (m)	204.3					
Travel Time (s)	14.7					
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	20	0	0	259	324	17
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	0	0	259	341	0
Sign Control	Stop					

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 26.7%	ICU Level of Service A
Analysis Period (min)	15

HCM 6th TWSC

2: Wellington Road 29 & Site Driveway

2030 Total AM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

Intersection						
Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	0	0	238	298	16
Future Vol, veh/h	18	0	0	238	298	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	0	0	259	324	17
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	592	333	341	0	-	0
Stage 1	333	-	-	-	-	-
Stage 2	259	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	469	709	1218	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	469	709	1218	-	-	-
Mov Cap-2 Maneuver	469	-	-	-	-	-
Stage 1	726	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	13	0		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1218	-	469	-	-	
HCM Lane V/C Ratio	-	-	0.042	-	-	
HCM Control Delay (s)	0	-	13	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.1	-	-	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖		↖	↖	↖	↖	↖		↖	↖	↖
Traffic Volume (vph)	39	573	121	59	500	42	219	260	88	51	168	35
Future Volume (vph)	39	573	121	59	500	42	219	260	88	51	168	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	55.0		55.0	75.0		0.0	50.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
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		0.974				0.850		0.962			0.974	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1570	1817	0	1805	1845	1615	1770	1814	0	1770	1756	0
Flt Permitted	0.357			0.182			0.610			0.373		
Satd. Flow (perm)	590	1817	0	346	1845	1615	1136	1814	0	695	1756	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15				46		18			11	
Link Speed (k/h)		80			80			80			80	
Link Distance (m)		360.1			209.0			510.2			193.6	
Travel Time (s)		16.2			9.4			23.0			8.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	15%	2%	1%	0%	3%	0%	2%	1%	0%	2%	3%	17%
Adj. Flow (vph)	42	623	132	64	543	46	238	283	96	55	183	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	755	0	64	543	46	238	379	0	55	221	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	27.9	27.9		27.9	27.9	27.9	22.5	22.5		22.5	22.5	
Total Split (s)	60.0	60.0		60.0	60.0	60.0	42.0	42.0		42.0	42.0	
Total Split (%)	58.8%	58.8%		58.8%	58.8%	58.8%	41.2%	41.2%		41.2%	41.2%	
Maximum Green (s)	52.1	52.1		52.1	52.1	52.1	35.0	35.0		35.0	35.0	
Yellow Time (s)	5.9	5.9		5.9	5.9	5.9	5.9	5.9		5.9	5.9	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	1.1	1.1		1.1	1.1	
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)	7.9	7.9		7.9	7.9	7.9	7.0	7.0		7.0	7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0	4.0	3.0	3.0		1.0	1.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Act Effect Green (s)	37.7	37.7		37.7	37.7	37.7	23.1	23.1		23.1	23.1	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.30	0.30		0.30	0.30	
v/c Ratio	0.15	0.84		0.38	0.60	0.06	0.70	0.68		0.26	0.41	
Control Delay	13.6	27.4		21.7	18.1	4.0	37.9	30.8		26.8	24.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.6	27.4		21.7	18.1	4.0	37.9	30.8		26.8	24.6	
LOS	B	C		C	B	A	D	C		C	C	
Approach Delay		26.7			17.4			33.5			25.0	

Lanes, Volumes, Timings

1: Wellington Road 29 & Highway 7

2030 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			B			C			C	
Queue Length 50th (m)	3.2	90.4		5.6	55.1	0.0	31.9	48.1		6.3	25.3	
Queue Length 95th (m)	11.1	179.2		19.8	108.5	5.6	68.6	93.1		18.5	52.9	
Internal Link Dist (m)		336.1			185.0			486.2			169.6	
Turn Bay Length (m)	75.0			55.0		55.0	75.0			50.0		
Base Capacity (vph)	421	1300		246	1316	1165	560	904		342	872	
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	0.10	0.58		0.26	0.41	0.04	0.42	0.42		0.16	0.25	

Intersection Summary

Area Type: Other

Cycle Length: 102

Actuated Cycle Length: 77

Natural Cycle: 60

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 25.7

Intersection LOS: C

Intersection Capacity Utilization 94.7%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 1: Wellington Road 29 & Highway 7



HCM 6th Signalized Intersection Summary

1: Wellington Road 29 & Highway 7

2030 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘	←	→	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔	↔	↔	↔		↔	↔	
Traffic Volume (veh/h)	39	573	121	59	500	42	219	260	88	51	168	35
Future Volume (veh/h)	39	573	121	59	500	42	219	260	88	51	168	35
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	1678	1870	1885	1900	1856	1900	1870	1885	1900	1870	1856	1648
Adj Flow Rate, veh/h	42	623	132	64	543	46	238	283	96	55	183	38
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	15	2	1	0	3	0	2	1	0	2	3	17
Cap, veh/h	300	755	160	187	936	812	357	450	153	235	498	103
Arrive On Green	0.50	0.50	0.50	0.50	0.50	0.50	0.33	0.33	0.33	0.33	0.33	0.33
Sat Flow, veh/h	742	1496	317	720	1856	1610	1160	1346	457	1004	1490	309
Grp Volume(v), veh/h	42	0	755	64	543	46	238	0	379	55	0	221
Grp Sat Flow(s), veh/h/ln	742	0	1813	720	1856	1610	1160	0	1803	1004	0	1800
Q Serve(g_s), s	3.9	0.0	32.6	7.6	18.9	1.3	18.1	0.0	16.3	4.5	0.0	8.6
Cycle Q Clear(g_c), s	22.8	0.0	32.6	40.2	18.9	1.3	26.7	0.0	16.3	20.8	0.0	8.6
Prop In Lane	1.00		0.17	1.00		1.00	1.00		0.25	1.00		0.17
Lane Grp Cap(c), veh/h	300	0	915	187	936	812	357	0	602	235	0	601
V/C Ratio(X)	0.14	0.00	0.83	0.34	0.58	0.06	0.67	0.00	0.63	0.23	0.00	0.37
Avail Cap(c_a), veh/h	345	0	1025	231	1049	910	410	0	685	281	0	683
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	19.4	36.5	16.0	11.7	33.4	0.0	25.9	34.7	0.0	23.3
Incr Delay (d2), s/veh	0.3	0.0	5.5	1.5	0.9	0.0	3.4	0.0	1.5	0.2	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(95%),veh/ln	0.6	0.0	5.8	1.5	2.4	0.1	5.0	0.0	5.4	1.1	0.0	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.3	0.0	24.9	38.0	16.9	11.7	36.8	0.0	27.4	34.9	0.0	23.4
LnGrp LOS	C	A	C	D	B	B	D	A	C	C	A	C
Approach Vol, veh/h	797			653			617			276		
Approach Delay, s/veh	24.9			18.6			31.0			25.7		
Approach LOS	C			B			C			C		
Timer - Assigned Phs	2			4			6			8		
Phs Duration (G+Y+Rc), s	54.4			37.8			54.4			37.8		
Change Period (Y+Rc), s	7.9			* 7			7.9			* 7		
Max Green Setting (Gmax), s	52.1			* 35			52.1			* 35		
Max Q Clear Time (g_c+I1), s	34.6			22.8			42.2			28.7		
Green Ext Time (p_c), s	8.2			0.6			4.3			2.1		

Intersection Summary

HCM 6th Ctrl Delay 24.8

HCM 6th LOS C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings

2: Wellington Road 29 & Site Driveway

2030 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

	←	→	↙	↘	←	→	↙	↘
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	↔			↔	↔			
Traffic Volume (vph)	55	0	0	512	311	37		
Future Volume (vph)	55	0	0	512	311	37		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00		
Frt							0.986	
Flt Protected	0.950							
Satd. Flow (prot)	1770	0	0	1863	1837	0		
Flt Permitted	0.950							
Satd. Flow (perm)	1770	0	0	1863	1837	0		
Link Speed (k/h)	50							80
Link Distance (m)	204.3							510.2
Travel Time (s)	14.7							23.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	60	0	0	557	338	40		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	60	0	0	557	378	0		
Sign Control	Stop			Free		Free		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 36.9% ICU Level of Service A

Analysis Period (min) 15

HCM 6th TWSC

2: Wellington Road 29 & Site Driveway

2030 Total PM Peak Hour

(230251) 8075 Highway 7, Guelph-Eramosa TIB

Intersection						
Int Delay, s/veh	1.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Vol, veh/h	55	0	0	512	311	37
Future Vol, veh/h	55	0	0	512	311	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	0	0	557	338	40

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	915	358	378	0	-	0
Stage 1	358	-	-	-	-	-
Stage 2	557	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	303	686	1180	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	303	686	1180	-	-	-
Mov Cap-2 Maneuver	303	-	-	-	-	-
Stage 1	707	-	-	-	-	-
Stage 2	574	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.8	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1180	-	303	-	-
HCM Lane V/C Ratio	-	-	0.197	-	-
HCM Control Delay (s)	0	-	19.8	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.7	-	-

Appendix F

AutoTURN Drawings





- NOTES:
- THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.
 - AIR PHOTO UNDERLAY SOURCE: GOOGLE EARTH
 - EXISTING PAVEMENT APPROXIMATE BASED OFF AIR PHOTO

NO.	DATE	INITIAL	REVISION DETAIL

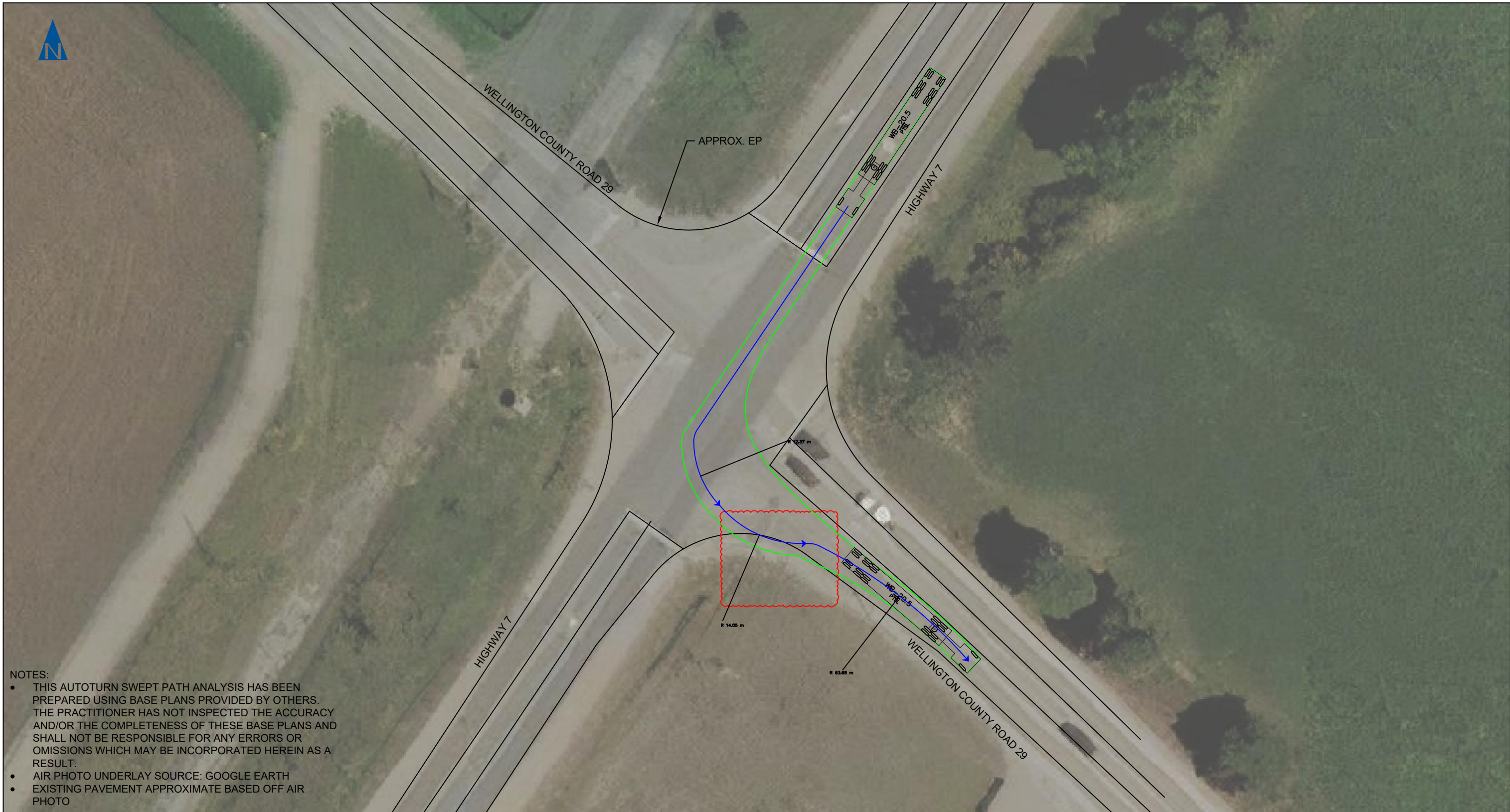
DESIGN VEHICLE:

WB-20.5

Tractor Width	: 2.60	Lock to Lock Time	: 6.0
Tractor Width	: 2.60	Steering Angle	: 30.1
Tractor Track	: 2.60	Articulating Angle	: 70.0
Tractor Track	: 2.60		

AUTOTURN ASSESSMENT - NORTHBOUND RIGHT-TURN HIGHWAY 7 & WELLINGTON COUNTY ROAD 29 GUELPH- ERAMOSA, ON

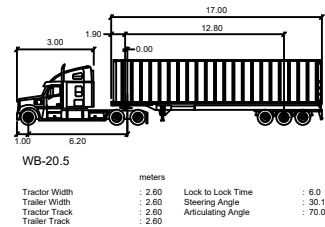
PROJECT NO.: 230251	DATE: FEBRUARY 2024	SCALE: 1:500	DRAWING NO.: 01
DRAWN: LC	DESIGN: LC	CHECK: RP	



- NOTES:
- THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.
 - AIR PHOTO UNDERLAY SOURCE: GOOGLE EARTH
 - EXISTING PAVEMENT APPROXIMATE BASED OFF AIR PHOTO

NO.	DATE	INITIAL	REVISION DETAIL

DESIGN VEHICLE:



AUTOTURN ASSESSMENT - WESTBOUND LEFT-TURN
HIGHWAY 7 & WELLINGTON COUNTY ROAD 29 GUELPH-
ERAMOSA, ON



PROJECT NO.: 230251

DATE: FEBRUARY 2024

SCALE: 1:500

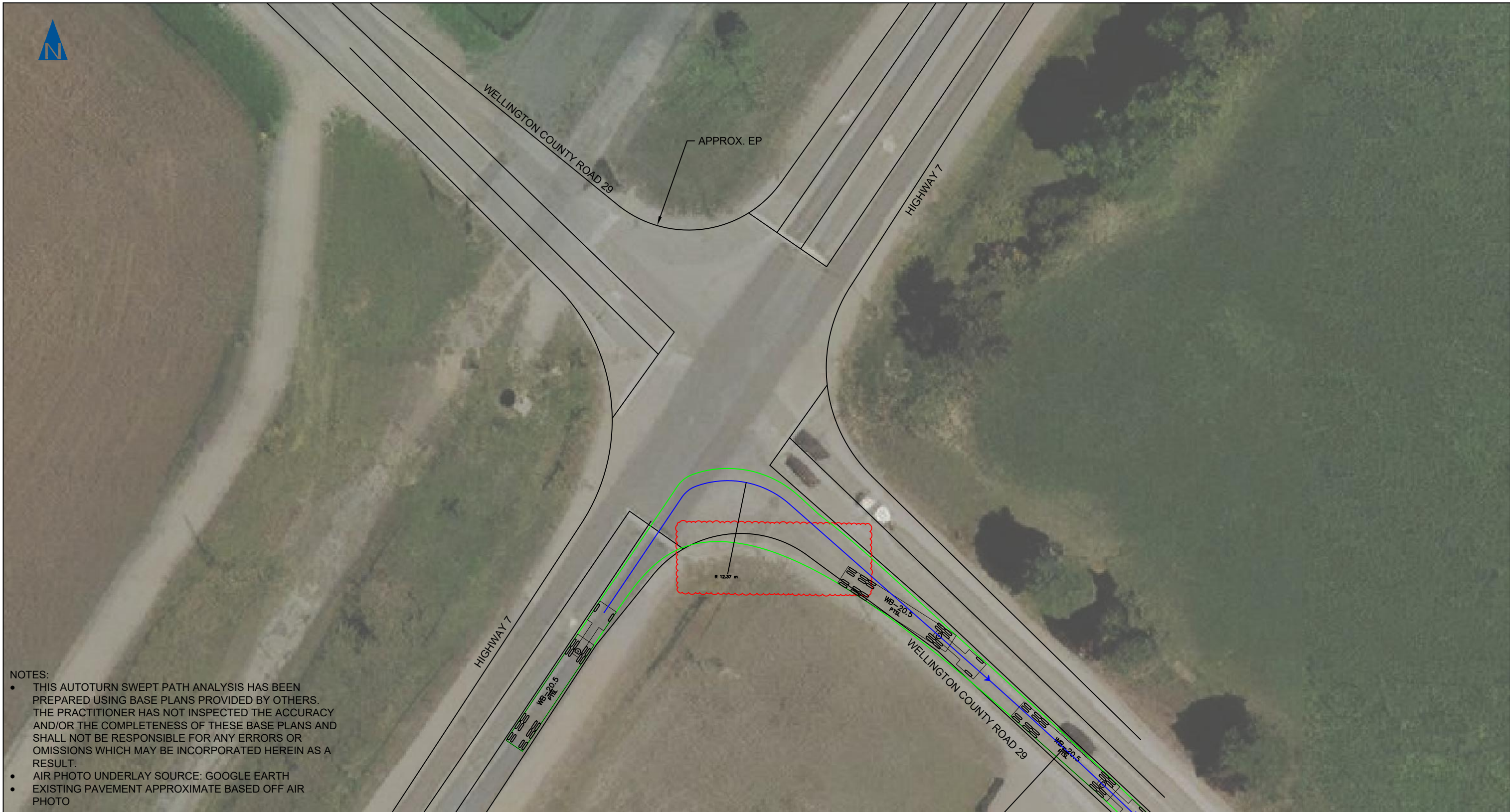
DRAWING NO.:

DRAWN: LC

DESIGN: LC

CHECK: RP

02



- NOTES:
- THIS AUTOTURN SWEEP PATH ANALYSIS HAS BEEN PREPARED USING BASE PLANS PROVIDED BY OTHERS. THE PRACTITIONER HAS NOT INSPECTED THE ACCURACY AND/OR THE COMPLETENESS OF THESE BASE PLANS AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.
 - AIR PHOTO UNDERLAY SOURCE: GOOGLE EARTH
 - EXISTING PAVEMENT APPROXIMATE BASED OFF AIR PHOTO

NO.	DATE	INITIAL	REVISION DETAIL


DESIGN VEHICLE:

WB-20.5

Tractor Width : 2.60
Trailer Width : 2.60
Tractor Track : 2.60
Trailer Track : 2.60

Lock to Lock Time : 6.0
Steering Angle : 30.1
Articulating Angle : 70.0

AUTOTURN ASSESSMENT - EASTBOUND RIGHT-TURN
HIGHWAY 7 & WELLINGTON COUNTY ROAD 29
GUELPH-ERAMOSA, ON



PROJECT NO.: 230251	DATE: FEBRUARY 2024	SCALE: 1:500	DRAWING NO.: 03
DRAWN: LC	DESIGN: LC	CHECK: RP	

