



Highway 140 at Kleinsmith Road Port Colborne, ON Transportation Impact Study Update

Paradigm Transportation Solutions Limited

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230726



Project Summary



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Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake a Transportation Impact Study (TIS) Update for the proposed development located east of the Welland Canal, west of Highway 140 and north of Forks Road in Port Colborne, Ontario.

Paradigm completed a Transportation Impact Assessment for these lands in 2020, proposing several dry industrial land uses. It is understood that the land has been sold to a new owner with industrial land uses proposed. The study has relied on the previous TIS completed for these lands; however, it has been updated based on changes to the development program.

This TIS includes an analysis of existing traffic conditions, a description of the proposed development traffic, traffic forecasts for 2026 (Phase 1), 2031 (Phase 1-2), 2036 (Phase 1-2), 2036 (Phase 1-3) and 2041 (Phase 1-3); and outlines recommendations to improve future traffic conditions.

Conclusions

The proposal includes developing the parcel as an industrial development with the primary function being manufacturing (conversion of raw materials or parts into finished products). In addition to the actual production of goods, the development will have office space and provide space for warehouses, research, and associated functions.

The development will be constructed within three building pads, equating to a total gross floor area (GFA) of 185,806 square metres. The site will also provide a total of 1,525 parking spaces. The build-out of the development is proposed to occur over three phases. The site is estimated to generate 302 AM (272 vehicles/30 trucks) and 350 PM (330 vehicles/20 trucks) peak-hour trips.

The Applicant proposes constructing a spur line that would provide rail access to/from the proposed development. The intent of this spur line connection is for the transportation of raw materials by rail instead of trucks, which could see truck volumes to/from the site decrease by approximately 18%. However, as this is a long-term initiative, the spur line has not been assumed to be operational to reflect a conservative estimate concerning traffic projections.



Vehicular access is proposed by a full-move intersection to Highway 140, approximately 400 metres north of Kleinsmith Road. However, the Ministry of Transportation (MTO) will not permit a private driveway entrance to the development but is willing to permit a new public road access to Highway 140 provided there is no increase in the total number of intersections on the highway.

This would require the closure of one intersection to create a new public road. The intersection of Kleinsmith Road, which has more limited use than Forks Road, would be the most desirable intersection to close. As such, Kleinsmith Road would no longer have direct access to Highway 140, and the existing residents off Kleinsmith Road would access Highway 140 via the new Public Access Road.

This new Public Access Road would be constructed west/south from Highway 140 to Kleinsmith Road, where a municipal road or driveway connection would serve it. The roadway would be constructed west of this point as a private industrial roadway to Forks Road opposite Snider Road. This private industrial road would service all the land north of Forks Roads. However, for this study, all site-generated trips are assigned to/from the Highway 140 access, as access to Forks Road will likely be limited to emergency access only.

At the approximate location of the proposed new Public Access Road, Highway 140 is relatively flat, with a slight horizontal curve on Highway 140 to the south of Kleinsmith Road. The sight distance within the road allowance to the north and south was measured as 300+ metres, which exceeds the minimum sight distance for a roadway with a design speed of 100 km/h.

Detailed traffic analysis was conducted for each of the study area intersections under Base (2024), 2026, 2031, 2036 and 2041 traffic conditions. The capacity analysis showed that deficiencies are projected to occur at certain locations within the study area with anticipated growth in traffic. The following capacity constraints at the study area intersections are identified.



Highway 140 at Regional Road 27

2024 Base Year Operations	Approaching Capacity	●
2026 Background Operations	Approaching Capacity	●
2026 Total Operations	Approaching Capacity	●
2031 Background Operations	Exceeding Capacity	●
2031 Total Operations PH1	Exceeding Capacity	●
2036 Background Operations	Exceeding Capacity	●
2036 Total Operations PH2	Exceeding Capacity	●
2036 Total Operations PH3	Exceeding Capacity	●
2041 Background Operations	Exceeding Capacity	●
2041 Total Operations PH3	Exceeding Capacity	●
2041 Total Operations PH3 (Alternative)	Exceeding Capacity	●
2041 Total Operations PH3 (Sensitivity)	Within Capacity	●

Based on the analysis of the intersection at Highway 140 and Regional Road 27, the northbound left turn lane currently operates in the LOS D range with a v/c ratio of 0.89 and is expected to degrade to LOS F with a v/c ratio greater than 1.00 overtime. Under the 2026 Background Horizon, the westbound left-turn lane is expected to experience increased delays, with a v/c ratio of 0.86 during the PM peak hour. By 2031, the westbound left-turn movement will further degrade to LOS E during the AM peak hour, with a v/c ratio exceeding 0.90, and to LOS F during the PM peak hour as the v/c ratio surpasses 1.00. By 2036, the eastbound through lane is anticipated to experience increased delays, eventually reaching LOS E with a v/c ratio greater than 0.95 in future horizons. By 2041, both the westbound and northbound left-turn movements are projected to deteriorate to LOS E and LOS F, with v/c ratios exceeding 1.00 during peak hours.

Similar levels of operation are expected between future Background and Total traffic conditions, with an additional increase in delay for the northbound left-turn movement. With respect to the alternative distribution assumptions, an increase in delay is proposed for the overcapacity movements (westbound and northbound left turn movements). However, the analysis remains fundamentally unchanged.

To accommodate traffic generated from general growth in the future, it is expected that modifications to the signal timings will be required:

- Replacing the signalized intersection at Highway 140 at Regional Road 27 to a two-lane roundabout.



Highway 140 at Access Road

2026 Total Operations	Increased Delays	●
2031 Total Operations PH1	Significant Delays	●
2036 Total Operations PH2	Significant Delays	●
2036 Total Operations PH3	Significant Delays	●
2041 Total Operations PH3	Significant Delays	●
2041 Total Operations PH3 (Alternative)	Significant Delays	●
2041 Total Operations PH3 (Sensitivity)	Within Capacity	●

At the unsignalized intersection of Highway 140 and Access Road, under the 2026 Total Horizon (weekday PM peak hour), the stop-controlled eastbound approach is projected to operate at LOS D with a v/c ratio no greater than 0.51.

Increased delay is projected for the stop-controlled approach during the 2031 and 2036 (PH2) Total Horizon, with the movement degrading to LOS F with a v/c ratio greater than 1.00 during the weekday PM peak hour.

With the additional traffic from Phase 3 (2036 PH3 and 2041 PH3), the stop-controlled approach is projected to continue operating at LOS F, with a v/c ratio exceeding 1.00 during the weekday PM peak hour.

To accommodate projected traffic volumes from the proposed development, adjustments to the roadway geometry are likely required and include the following:

- ▶ Deceleration right-turn lane (Opening Day).
- ▶ Acceleration right-turn lane (Opening Day).
- ▶ Northbound left-turn lane (Opening Day).
- ▶ Traffic control signals or a roundabout (Phase 2).



Recommendations

Based on the findings of this study, it is recommended that:

- ▶ The intersection of Highway 140 at Kleinsmith Road be closed with access for residents of Kleinsmith Road provided via the new Public Access Road.
- ▶ The Applicant be responsible for costs related to the new roadway connection to Highway 140 (Access Road), which includes a southbound left turn lane, deceleration and acceleration right turn lanes, and potentially unwarranted traffic control signals or a roundabout.
- ▶ The Ministry of Transportation and Niagara Region monitor the future traffic volumes at the intersection of Highway 140 and Regional Road 27/East Main Street and considers constructing a two-lane roundabout accordingly.



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1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained to undertake a Transportation Impact Study (TIS) for an industrial development located east of the Welland Canal, west of Highway 140 and north of Forks Road in Port Colborne, Ontario. **Figure 1.1** illustrates the location of the subject site.

This study determines the impacts of the additional traffic generated by the subject site on the surrounding road network and the remedial measures necessary to accommodate future traffic satisfactorily. The scope of this includes:

- ▶ Determine and assess the current study area traffic conditions;
- ▶ Forecast the additional traffic generated by the proposed development;
- ▶ Analyze the impacts of the additional traffic on the study area intersections for the following horizons: 2026 (Phase 1), 2031 (Phase 1-2), 2036 (Phase 1-2), 2036 (Phase 1-3) and 2041 (Phase 1-3); and
- ▶ Recommend any necessary remedial measures to mitigate the traffic impacts.

Paradigm previously completed a Transportation Impact Assessment for these lands in 2020¹, proposing several dry industrial land uses. It is understood that the land has been sold to a new owner with industrial land uses proposed. The study has relied on the previous TIS completed for these lands; however, it has been updated based on changes to the development program. The study follows the Ministry of Transportation (MTO) Transportation Impact Study Guidelines².

¹ 200364: Nyon Oil Incorporate Phase 1, Port Colborne, ON TIS Update, Paradigm, September 2020

² Ministry of Transportation, Ontario Traffic Impact Study Guidelines, March 2023

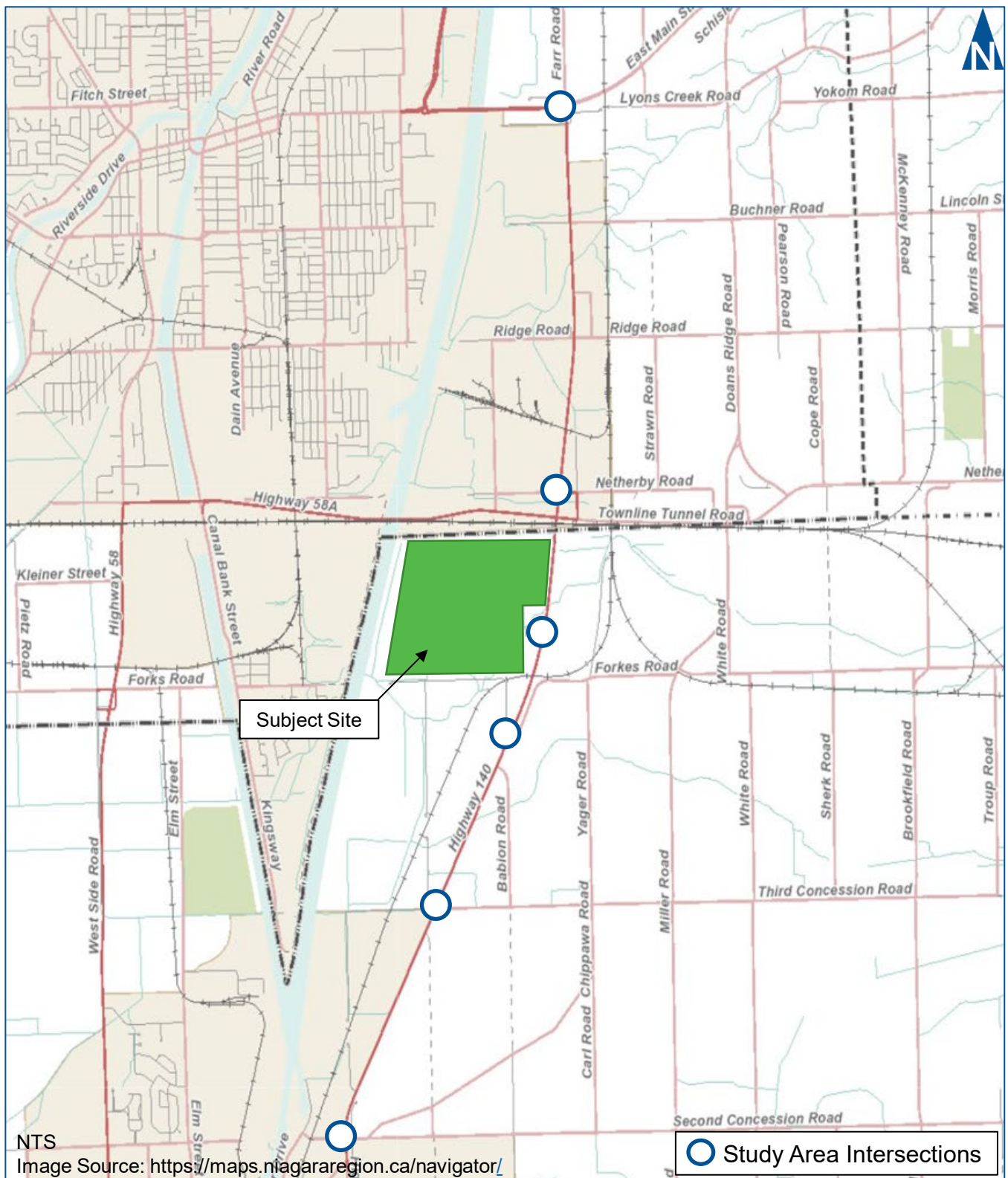


1.2 Study Area

The study area intersections assessed in this study include:

- ▶ Highway 140 at Regional Road 27 (East Main Street) (signalized);
- ▶ Highway 140 at Netherby Road (Roundabout);
- ▶ Highway 140 at Kleinsmith Road (unsignalized);
- ▶ Highway 140 at Forks Road (unsignalized);
- ▶ Highway 140 at Third Concession Road (unsignalized);
- ▶ Highway 140 at Second Concession Road (signalized); and
- ▶ Proposed full-moves new Public Access Road onto Highway 140.





2 Existing Conditions

2.1 Road Network

The key roadways within the study area are described as follows:

- ▶ **Highway 140** is a two-lane rural highway connecting Highway 406 and Regional Road 27 (East Main Street) in Welland to Highway 3 in Port Colborne, under the Ministry of Transportation's (MTO) jurisdiction. The posted speed limit is 80 km/h.
- ▶ **Regional Road 27 (East Main Street)** is a major east-west arterial roadway in the Region of Niagara's transportation network³. Regional Road 27 commences in the east at Regional Road 98 (Montrose Road) in the City of Niagara Falls and extends westward, providing access to the City of Welland. Traffic signal control is provided at the intersection of Highway 140 and East Main Street.
- ▶ **Netherby Road** is a two-lane east-west rural roadway under the jurisdiction of the City of Welland⁴. Netherby Road provides access to Highway 58 (Townline Tunnel Road) from Highway 140. Highway 140 and Netherby Road intersection is currently being reconstructed into a roundabout and has been assumed to be operational under existing conditions.
- ▶ **Forks Road, Kleinsmith Road, Third Concession Road, and Second Concession Road** are two-lane rural east-west roadways under the jurisdiction of the City of Port Colborne⁵. Traffic control signals are provided at Highway 140 and Second Concession Road intersection. On the minor approaches, two-way stop control is provided at Highway 140 intersections of Forks Road, Kleinsmith Road, and Third Concession Road.

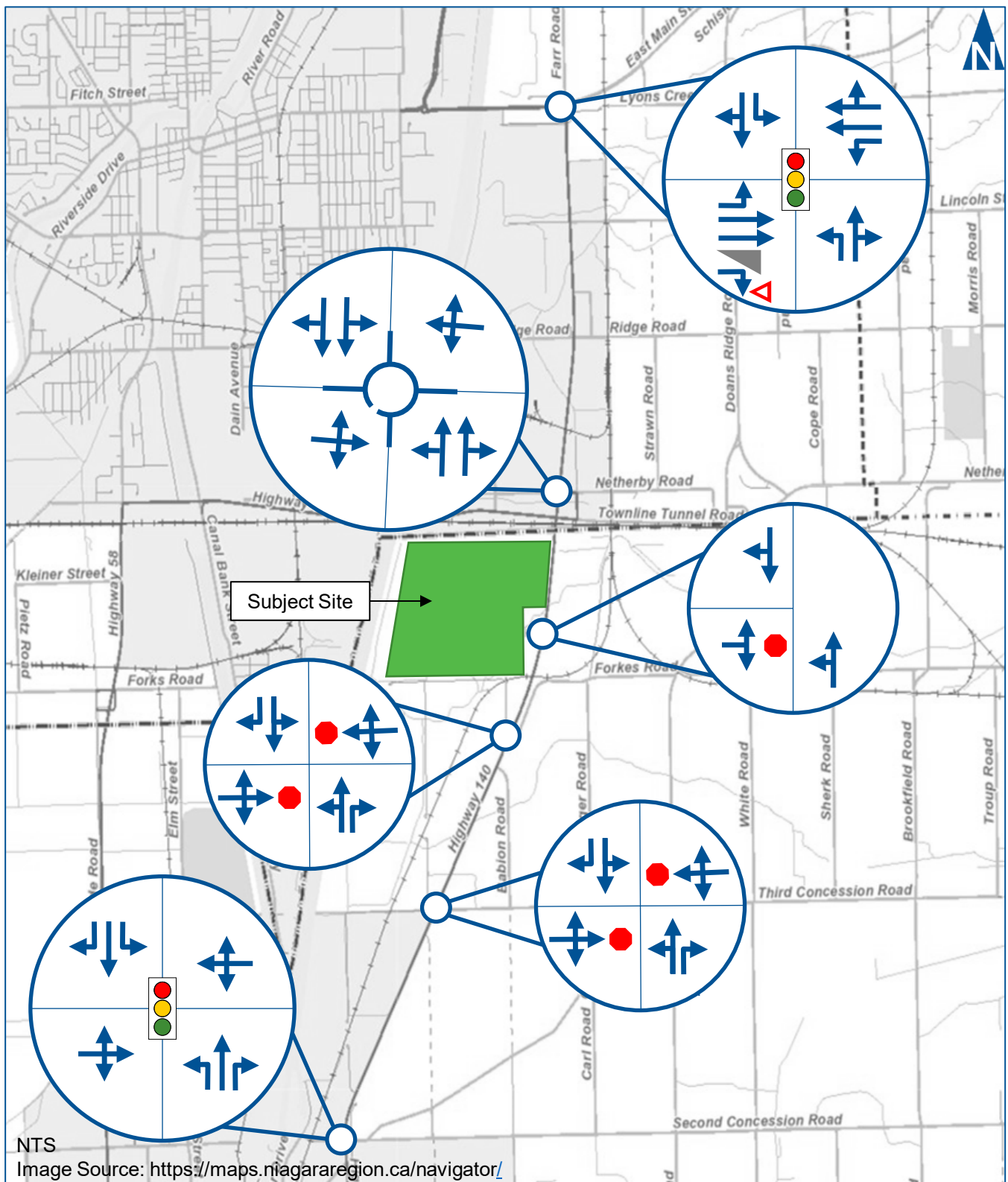
Figure 2.1 illustrates the study area's existing lane configurations and traffic control.

³ Niagara Region Official Plan, Schedule E1: Transportation Infrastructure, May 2019

⁴ City of Welland Official Plan, Schedule E: Road Hierarchy, Revised July 15, 2020

⁵ Port Colborne Official Plan, Schedule D: Transportation, September 2017





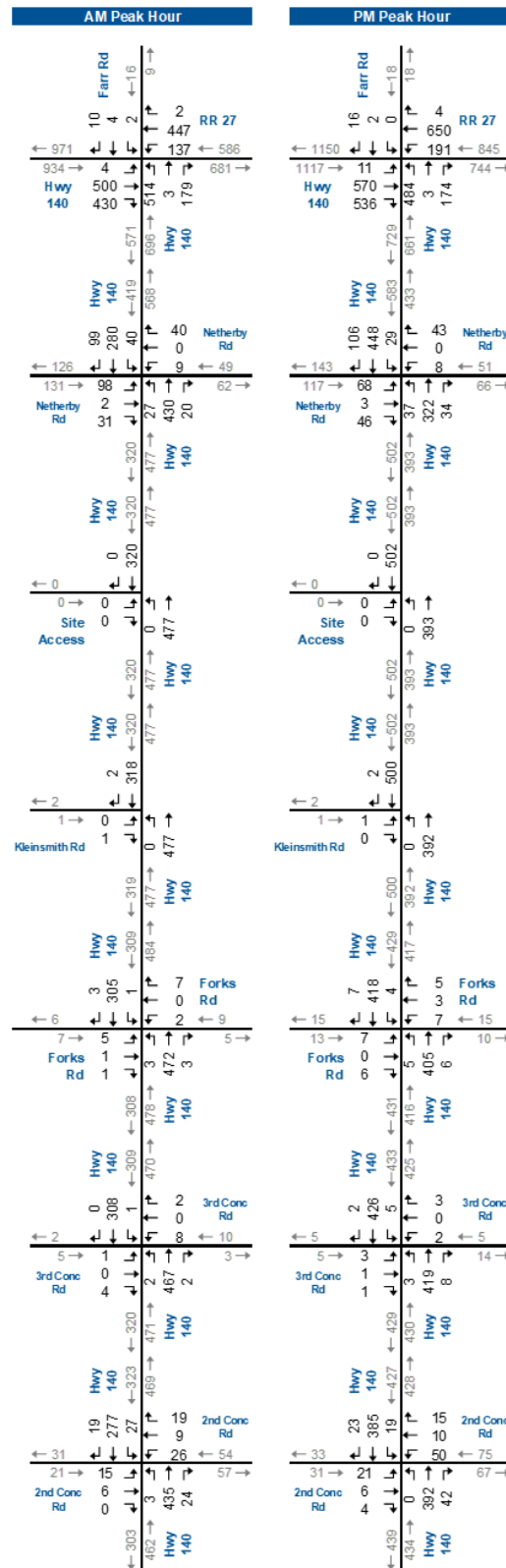
2.2 Traffic Volumes

Turning movement counts (TMC) are used to quantify the movement of vehicles through the area to assess intersection operation. Existing traffic data at an intersection or road section forms the foundation for analysis. The counts are usually taken during peak periods at an intersection to complete the level of service analysis.

Paradigm collected Turning Movement Counts (TMC) data at the study area intersections in October 2024. **Appendix A** contains the traffic data utilized in this report.

Figure 2.2 illustrates the existing peak-hour traffic volumes.





3 Development Concept

3.1 Development Description

The proposed site is east of the Welland Canal, generally west of Highway 140 and north of Forks Road in Port Colborne. The vacant property has minimal agricultural uses, with bush and rural residential units throughout the area.

The proposal includes developing the parcel as an industrial development with the primary function being manufacturing (conversion of raw materials or parts into finished products). In addition to the actual production of goods, the development will have office space and provide space for warehouses, research, and associated functions. **Figure 3.1** illustrates the proposed site plan.

The development will be constructed within five building pads, equating to a total gross floor area (GFA) of 185,806 square metres. The site will also provide a total of 1,525 parking spaces. Build-out of the development is proposed to occur over three phases as noted as follows:

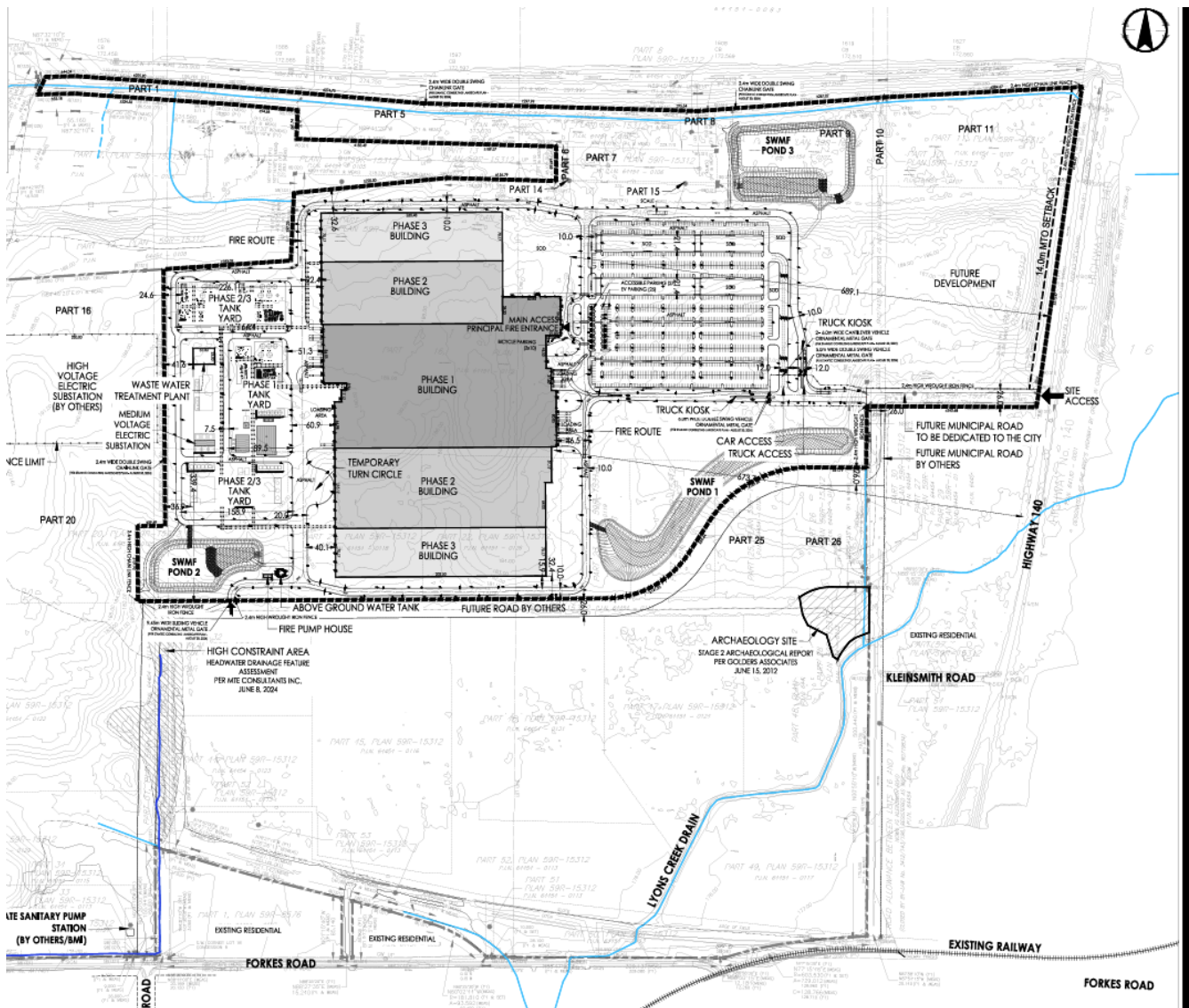
- ▶ Phase 1 (2026): 60,387 square metres (approximate)
- ▶ Phase 2 (2031): 65,032 square metres (approximate)
- ▶ Phase 3 (2036): 60,387 square metres (approximate)

Table 3.1 outlines the site's operational characteristics based on information the Applicant provided.

TABLE 3.1: OPERATIONAL CHARACTERISTICS

Variable	Phase 1	Phase 2	Phase 3
Operating Hours Per Day	24	24	24
Operating Days	Mon-Sun	Mon-Sun	Mon-Sun
Total Employees	460	810	1,010
Daily Passenger Vehicles Generated	1,264	1,924	2,200
Daily Truck Trips Generated	88	170	206
Daily Total Trips Generated	1,352	2,094	2,406





NTS



Site Plan

Highway 140 & Kleinsmith Road, Port Colborne, TIA
230726

Figure 3.1

3.1.1 History of Site Access

In 2013, Nyon Marine Fuelling Corporation owned the development parcel and proposed developing the site as an energy and industrial park. The use of Kleinsmith Road as the primary access was previously reviewed in 2012 by Paradigm, which determined that Kleinsmith Road was unsuitable, and an alternative connection was required. **Appendix B1** includes the 2012 Access Review; the following summarizes the main points:

- ▶ Kleinsmith Road is presently a gravel roadway and provides access to a single-family residence.
- ▶ The existing resident of the immediate surrounding area would be impacted by large tanker truck traffic passing by their home daily.
- ▶ The sight distance at the intersection is inferior due to the intersection being located immediately north of the railway overpass. Safety concerns related to trucks turning to go northward impeding traffic northbound over the rail overpass due to restricted sight distance.
- ▶ Heavily loaded trucks exiting the site to go south would have greater impacts on Highway 140 traffic due to slow acceleration and speed in negotiating the grades associated with southbound movement over the rail overpass.

As part of the 2013 development application, several meetings and discussions occurred with the MTO and the City of Port Colborne regarding the proposed access connection to Highway 140. Through these discussions, the MTO advised that a private driveway entrance to the energy and industrial park would not be permitted; however, the MTO would permit a new public road access to Highway 140 provided that the total number of intersections on the highway does not increase. This would require closing Kleinsmith Road to create a new public road.

- ▶ On December 10th, 2012, the City of Port Colborne Council approved the closure of Kleinsmith Road. **Appendix B2** includes the letter the City provided to the MTO.
- ▶ On March 27th, 2015, the MTO advised Paradigm that the proposed new intersection off Highway 140 and the closure of Kleinsmith Road was acceptable. **Appendix B3** includes an email correspondence from the MTO.
- ▶ The City of Port Colborne and Nyon Oil Marine Fuelling Corporation reached an agreement on April 30th, 2015. The road agreement is included in **Appendix B4**.



3.1.2 Current Proposal

Based on the previous work carried out for this site, it is understood that the Ministry of Transportation (MTO) will not permit a private driveway entrance to the development but is willing to permit a new public road access to Highway 140 provided there is no increase in the total number of intersections on the highway.

This would require the closure of one intersection to create a new public road. The intersection of Kleinsmith Road, which has more limited use than Forks Road, would be the most desirable intersection to close.

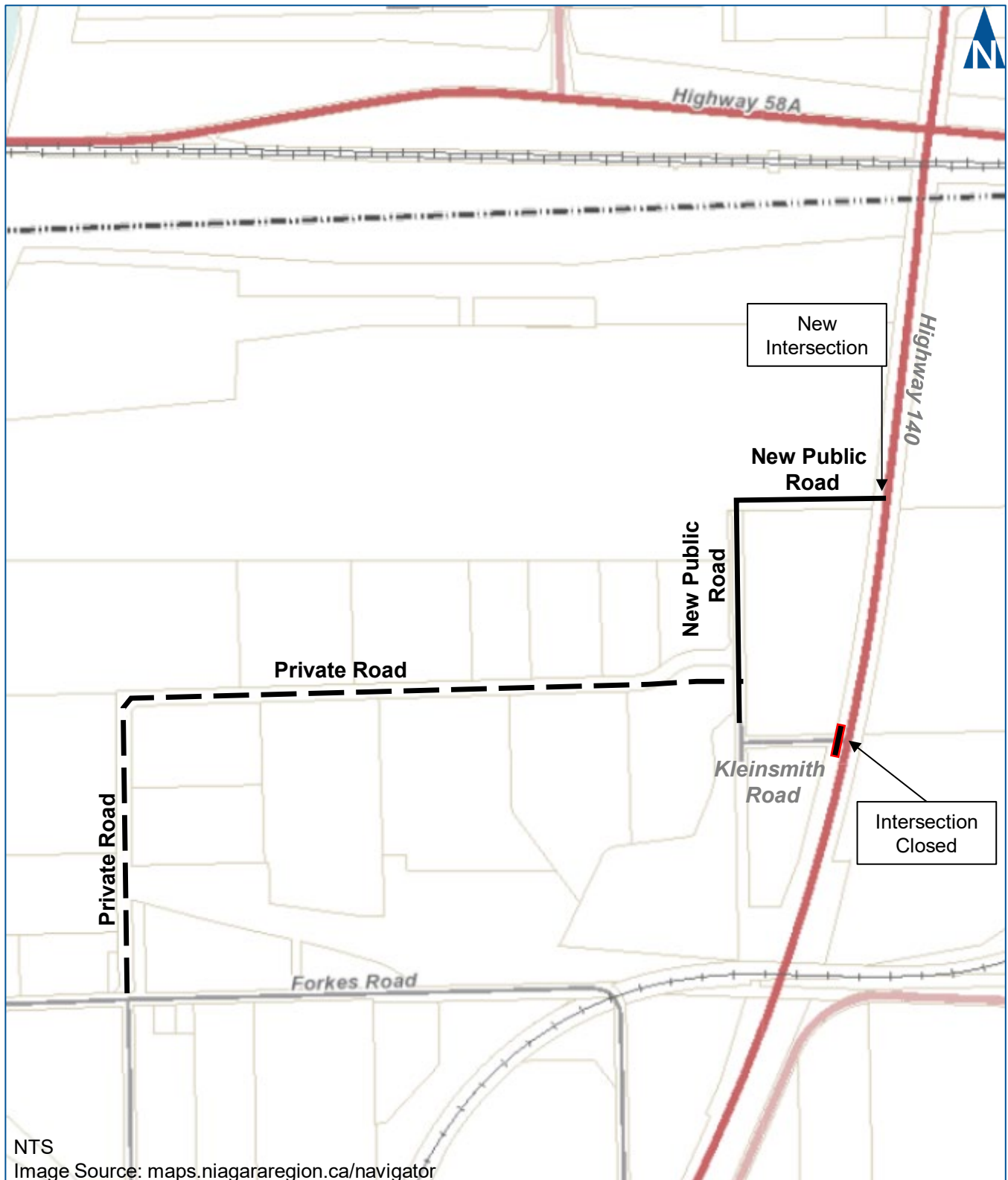
As such, Kleinsmith Road would no longer have direct access to Highway 140, and the existing residents off Kleinsmith Road would access Highway 140 via the new Public Access Road.

This new Public Access Road would be constructed approximately 400 metres north of Kleinsmith Road. From that point, the new Public Access Road would be constructed west/south from Highway 140 to Kleinsmith Road, where a municipal road or driveway connection would serve it. The roadway would be constructed west of this point as a private industrial roadway to Forks Road opposite Snider Road. This private industrial road would service all the land north of Forks Roads.

As presented by the current proposal, the roadway network and access to Highway 140 adheres to the new municipal roadway location as previously contemplated by Nyon Oil and outlined in Schedule A of the road agreement contained in **Appendix B4**. Based on the previous work carried out by Paradigm in 2012 and the supplemental review completed in August 2024 regarding the feasibility of a construction access through Kleinsmith Road (**Appendix B5**), the new municipal road to Highway 140 has been determined to be appropriate for providing permanent access to the Asahi Kasei development.

Figure 3.2 illustrates a schematic of the road network.





3.1.3 Sight Distance

The posted speed limit of Highway 140 is 80 km/h. Using a design speed of 100 km/h (20 km/h above the posted speed limit), the following sight distance requirements are noted:

- ▶ Minimum stopping sight distance – 185 m⁶; and
- ▶ Intersection sight distance:
 - Left-turn from stop – 210 m⁷;
 - Right-turn from stop – 185 m⁸.

At the approximate location of the proposed new Public Access Road, Highway 140 is relatively flat, with a slight horizontal curve on Highway 140 to the south of Kleinsmith Road. The sight distance within the road allowance to the north and south was measured as 300+ metres, which exceeds the minimum sight distance for a roadway with a design speed of 100 km/h.

3.1.4 Heavy Vehicles

The site's primary design vehicle is anticipated to be a Transportation Association of Canada (TAC) WB-20 tractor-semitrailer⁹. The fueling land use could result in the site operator using A-train doubles (ATD) or B-train doubles (BTD) design vehicles. However, the frequency of these design vehicles is dependent on the logistics used for the site.

The minimum turning radius for a WB-20 is 10.7 metres for a 90-degree turn, but it also depends on lane width. Smaller straight-frame vehicles are expected to be used for refuse collection and localized deliveries (courier vehicles) supportive of the site.

Swept path turning analysis should be considered during the final design of the subject site to ensure safe turning movements from Highway 140 and any driveways from the new Public Access Road.

Heavy vehicle traffic is anticipated to utilize the Provincial highway network. Therefore, truck trips generated by the subject site are

⁶ TAC Table 2.5.2. Stopping Sight Distance on level roadways for Automobiles

⁷ TAC Table 9.9.4. Design Intersection Sight Distance – Case B1, Left-Turn from Stop

⁸ TAC Table 9.9.6. Design Intersection Sight Distance – Case B2, Right-Turn from Stop

⁹ Transportation Association of Canada. Geometric Design Guide for Canadian Roads (2017), Section 2.4.2 Vehicle Classifications



expected to travel north and south on Highway 140 to the Highway 406 intersection in the north and Highway 3 intersection in the south. From there, the truck trips are expected to be disbursed throughout the area.

3.1.5 Spur Line

The Humberstone Spur runs along the south limit of the property. The Applicant proposes constructing a spur line that would provide rail access to/from the proposed development. The intent of this spur line connection is for the transportation of raw materials by rail instead of trucks, which could see truck volumes to/from the site decrease by approximately 18%. However, as this is a long-term initiative, the spur line has not been assumed to be operational to reflect a conservative estimate concerning traffic projections.



3.2 Site Generated Traffic

3.2.1 First Principles Approach

Trips generated by the proposed transfer station have been estimated for the weekday AM and PM peak hours based on a first principles approach based on information provided by the Applicant as outlined in **Table 3.1**. Based on the information supplied by the Applicant, the proposed development is expected to generate:

- ▶ 1,352 daily trips (1,264 vehicles/88 trucks) for Phase 1,
- ▶ 2,094 daily trips (1,924 vehicles/170 trucks) for Phases 1-2, and
- ▶ 2,406 daily trips (2,200 vehicles/206 trucks) for Phases 1-3.

It is noted that these are daily trips expected to be generated throughout 24 hours. The estimates for reasonable trips during weekday peak hours have been refined based on time-of-day plots in the Institute of Transportation Engineers Trip Generation Manual¹⁰. These plots pertain to a manufacturing facility (Land Use Code of 140).

The Trip Generation Manual contains data about reported time period distributions of traffic for vehicles and trucks over a 24-hour. This data has been used to develop the time-of-day distribution expected at the proposed development based on the daily trips expected by the Applicant. This distribution has been further refined to determine the peak hours of the development for the weekday AM and PM peak hours. **Appendix C** contains the time-of-day distribution.

Table 3.2 provides the weekday peak hour trip generation based on a first principles approach and indicates that with full build of the development, approximately 260 AM and 350 PM peak hour trips could be generated.

¹⁰ Institute of Transportation Engineers, *Trip Generation Manual*, 11th ed., (Washington, DC: ITE, 2021).



TABLE 3.2: TRIP GENERATION – FIRST PRINCIPLES

Phase	Number of Employees	Trip Type	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
1	460	Trucks	5	5	10	4	5	9
		Employees	114	23	137	59	130	189
		Total	119	28	147	63	135	198
1-2	810	Trucks	10	9	19	7	9	16
		Employees	173	34	207	90	198	288
		Total	183	43	226	97	207	304
1-3	1010	Trucks	12	11	23	9	11	20
		Employees	198	39	237	103	227	330
		Total	210	50	260	112	238	350

The trip generation estimates based on a first principles approach were also compared with industry standard trip generation information in the Institute of Transportation Engineers (ITE) Trip Generation Manual, as noted in the following sub-section.

3.2.2 ITE Approach

Trips generated by the proposed development have also been estimated for the weekday AM and PM peak hours based on the rates provided by ITE. The following land use codes were referenced:

- ▶ LUC 140: Manufacturing - A manufacturing facility is an area where the primary activity is the conversion of raw materials or parts into finished products. Size and type of activity may vary substantially from one facility to another. In addition to the actual production of goods, a manufacturing facility typically has an office and may provide space for warehouse, research, and associated functions. General light industrial (Land Use 110) and industrial park (Land Use 130) are related uses.

Data for the peak hours of adjacent street traffic were used to estimate trip generation. Fitted curve equations with satisfactory R^2 values and independent variables were applied. The average rates have been applied if no equations were provided or satisfactory R^2 values and independent variables were unavailable.

Table 3.3 provides the weekday peak hour trip generation based on a first principles approach and indicates that with full build of the development, approximately 302 AM and 266 PM peak hour trips could be generated.



TABLE 3.3: TRIP GENERATION – ITE RATES

Phase	Number of Employees	Trip Type	AM Peak Hour				PM Peak Hour			
			Rate	In	Out	Total	Rate	In	Out	Total
1	460	Trucks	0.03	8	6	14	0.02	3	6	9
		Employees	Eqn. ^A	102	38	140	Eqn. ^B	48	82	130
		Total		110	44	154		51	88	139
1-2	810	Trucks	0.03	14	10	24	0.02	6	10	16
		Employees	Eqn. ^A	163	61	224	Eqn. ^B	75	129	204
		Total		177	71	248		81	139	220
1-3	1010	Trucks	0.03	18	12	30	0.02	7	13	20
		Employees	Eqn. ^A	198	74	272	Eqn. ^B	91	155	246
		Total		216	86	302		98	168	266

$$^A T = 0.24(X) + 29.47$$

$$^B T = 0.21(X) + 33.45$$

3.2.3 Hybrid Approach

Based on the estimates, the ITE rates are noted to generate 42 more trips during the AM peak than the first principle estimated. However, during the PM peak hour, the first principles estimates will generate 84 more trips than the ITE rates. Given the peak hour differences, a hybrid trip generation has been created that utilizes the higher trip estimates of the ITE rates for the AM peak hour and the first principles estimates for the PM peak hour. Utilizing this hybrid approach, the highest number of trips for the AM and PM peak hours can be accounted for in the analysis.

Table 3.4 summarizes the hybrid trip generation estimates that assume the proposed development will generate 302 AM and 350 PM peak-hour trips.

TABLE 3.4: TRIP GENERATION – HYBRID RATES

Phase	Number of Employees	Trip Type	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
1	460	Trucks	8	6	14	4	5	9
		Employees	102	38	140	59	130	189
		Total	110	44	154	63	135	198
1-2	810	Trucks	14	10	24	7	9	16
		Employees	163	61	224	90	198	288
		Total	177	71	248	97	207	304
1-3	1010	Trucks	18	12	30	9	11	20
		Employees	198	74	272	103	227	330
		Total	216	86	302	112	238	350



3.2.4 Passenger Car Equivalents (PCE)

For the analysis, truck traffic volumes have been converted to passenger car equivalents (PCE) to account for the additional time required for a heavy vehicle loaded with material to travel through an intersection. Based on our experience, a PCE factor of 2.5 is typically applied¹¹.

Table 3.5 summarizes the trip generation estimates with the incorporation of the PCE. These trip estimates have been utilized in the synchro analysis and are provided in **Appendix D**.

TABLE 3.5: TRIP GENERATION – HYBRID RATES (PCE)

Phase	Number of Employees	Trip Type	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
1	460	Trucks (PCE)	20	15	35	10	13	23
		Employees	102	38	140	59	130	189
		Total	122	53	175	69	143	212
1-2	810	Trucks (PCE)	35	25	60	18	23	41
		Employees	163	61	224	90	198	288
		Total	198	86	284	108	221	329
1-3	1010	Trucks (PCE)	45	30	75	23	28	51
		Employees	198	74	272	103	227	330
		Total	243	104	347	126	255	381

¹¹ Canadian Capacity Guide for Signalized Intersections, ITE, 2008



3.2.5 Trip Distribution

The trip distribution during the AM and PM peak hours was taken from the previous 2020 TIS study completed,¹² which has previously forecasted the site trips based on the Transportation Tomorrow Survey¹³ for employees and a first-principle approach for trucks.

It is acknowledged that the data contained in the 2020 TIS reflects a 2011 TTS database, whereas a 2016 TTS database is available. To provide an update to the trip distribution estimates, the 2016 TTS data has been utilized and indicates a slight decrease in trips to/from the south from 75% to 67% as initially portrayed in the 2020 TIS.

Table 3.6A outlines the employee trip distribution for this scenario. **Figure 3.3** illustrates the forecast site-generated traffic for Phases 1-3 (non-PCE).

¹² 200364: Nyon Oil Incorporated Phase 1, Port Colborne ON, Transportation Impact Study Update

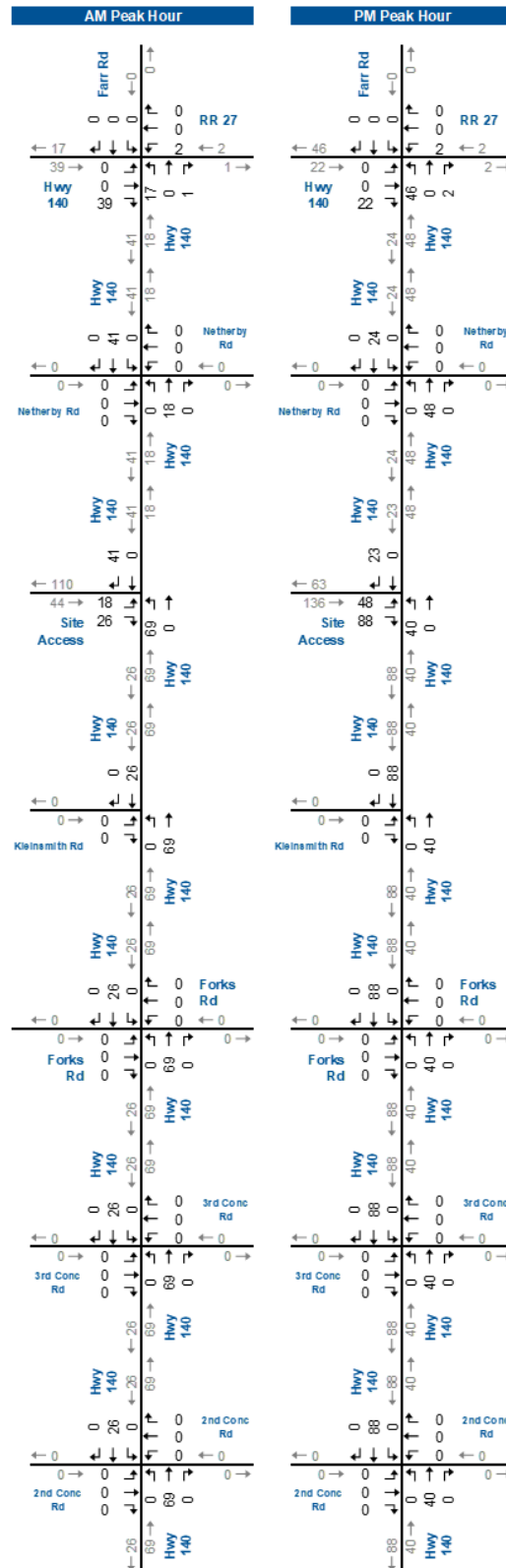
¹³ Transportation Tomorrow Survey, Data Management Group, 2016

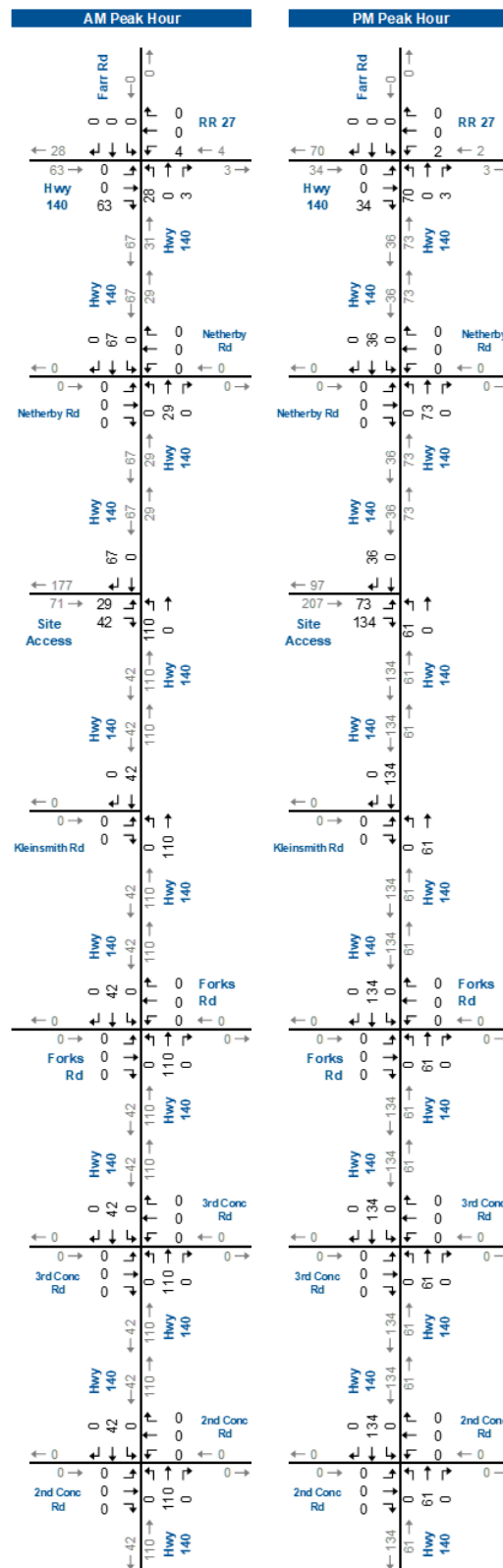


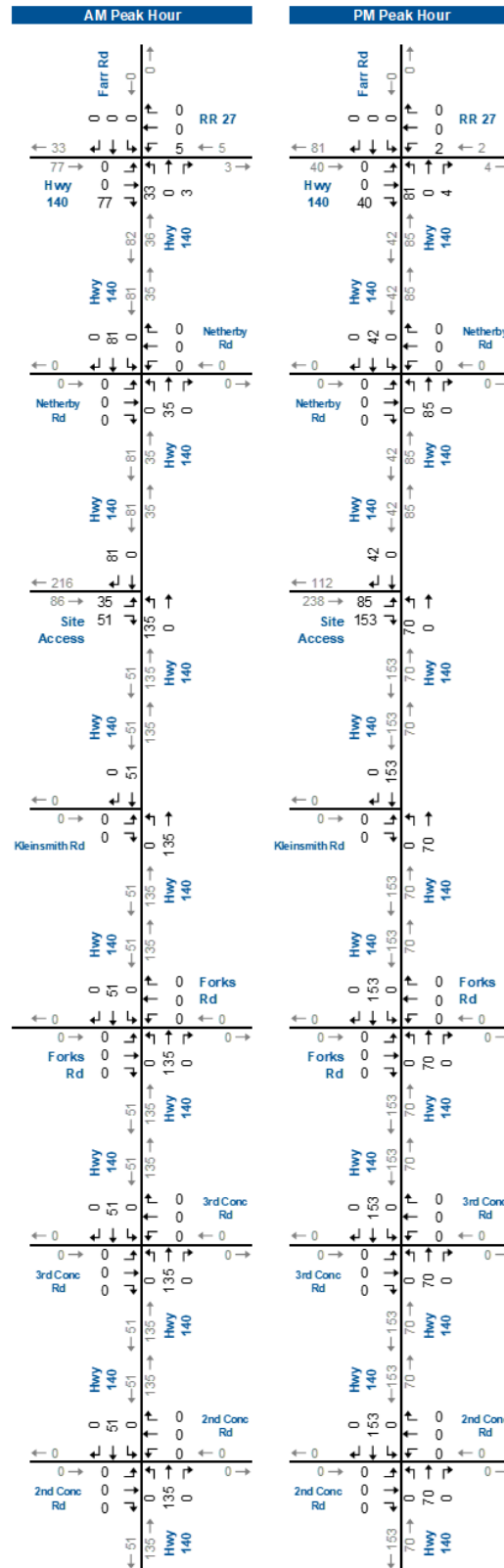
TABLE 3.6A: ESTIMATED TRIP DISTRIBUTION

Employee Trip Distribution						Truck Trip Distribution	
Travel Origin/Destination		Route		Employee Direction Summary		Truck Direction Summary	
Pelham	2%	North via Hwy 140/West via RR 27	2%	South via Hwy 140/West via Hwy 3	63%	South via Hwy 140/West via Hwy 3	0%
St.Catharines	7%	North via Hwy 140/West via RR 27	7%				
Thorold	3%	North via Hwy 140/West via RR 27	3%				
Niagara Falls	1%	North via Hwy 140/East via RR 27	1%	North via Hwy 140/West via RR 27	32%	North via Hwy 140/West via RR 27	75%
Welland	17%	North via Hwy 140/West via RR 27	17%				
Port Colborne	55%	South via Hwy 140/West via Hwy 3	55%	North via Hwy 140/East via RR 27	1%	North via Hwy 140/East via RR 27	15%
Wainfleet	8%	South via Hwy 140/West via Hwy 3	8%				
Fort Erie	4%	South via Hwy 140/East via Hwy 3	4%				
NOTL	1%	North via Hwy 140/West via RR 27	1%	South via Hwy 140/East via Hwy 3	4%	South via Hwy 140/East via Hwy 3	10%
Burlington	1%	North via Hwy 140/West via RR 27	1%				
Lincoln	1%	North via Hwy 140/West via RR 27	1%				
Total	100%		100%	Total	100%	Total	100%









3.2.6 Alternative Employee Distribution

Due to comments received from the Town of Port Colborne regarding employee trip distribution, an alternative scenario has been developed to assess the impacts on the study area roadways under the 2041 horizon with an alternative distribution pattern.

Based on future population projections, this distribution assumes that a significant portion of employees would originate from adjacent municipalities within the Niagara Region. The population projections have been taken from the Region's 2022 Official Plan.¹⁴ Based on this methodology, trips to/from the south are expected to be reduced to approximately 10%.

To determine the ultimate impacts on the study area intersections under this distribution scenario, Scenario B has only been modelled for the 2041 horizon, which assumes five years after full build-out. **Table 3.6B** outlines the employee trip distribution for this scenario. **Figure 3.4** illustrates the forecast site-generated traffic for Phases 1-3 (non-PCE).

¹⁴ Making Our Mark – Niagara Official Plan, May 2024 Consolidation

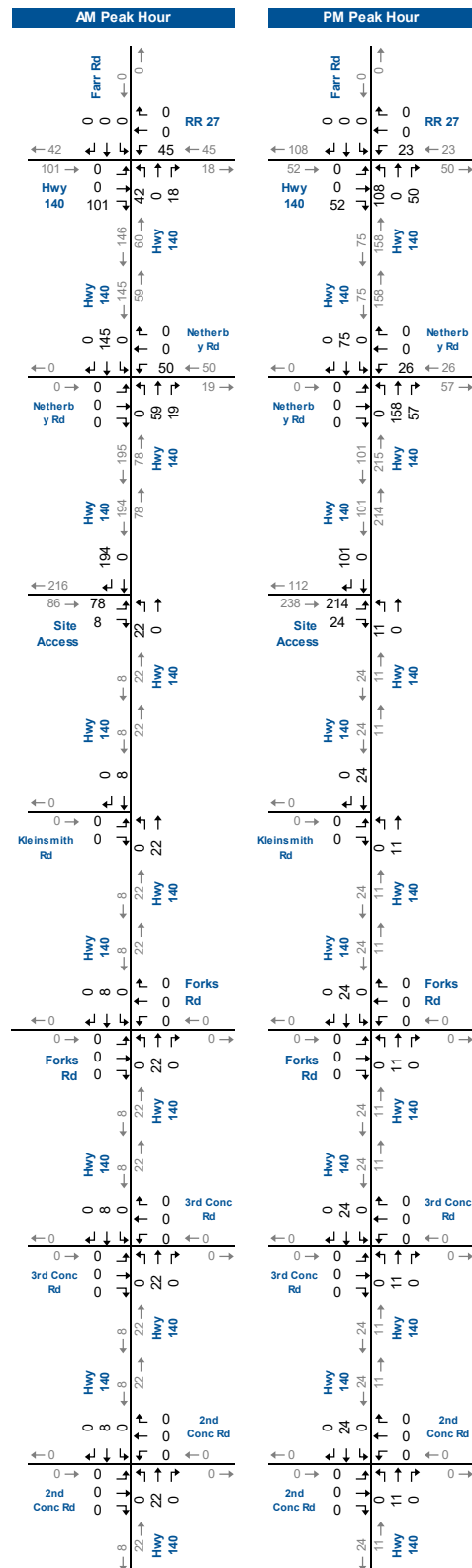


TABLE 3.6B: ESTIMATED TRIP DISTRIBUTION (ALTERNATIVE)

Employee Distribution				Truck Trip Distribution	
Location	2051 Population Projection*	Route	Employee Direction Summary	Truck Direction Summary	
Fort Erie	48,050	South via Hwy 140/East via Hwy 3 6.9%	South via Hwy 140/East via Hwy 3 7%	South via Hwy 140/East via Hwy 3	10%
Grimsby	37,000	North via Hwy 140/West via RR 27 5.3%			
Lincoln	45,660	North via Hwy 140/East via Netherby Road 6.6%	South via Hwy 140/West via Hwy 3 3%	South via Hwy 140/West via Hwy 3	0%
Niagara Falls	141,650	North via Hwy 140/East via RR 27 20.4%	North via Hwy 140/West via RR 27 44%	North via Hwy 140/West via RR 27	75%
Niagara-on-the-Lake	28,900	North via Hwy 140/West via RR 27 4.2%			
Pelham	28,830	North via Hwy 140/West via RR 27 4.2%	North via Hwy 140/East via Netherby Road 25%	North via Hwy 140/East via Netherby Road	0%
Port Colborne	23,230	South via Hwy 140/West via Hwy 3 3.3%			
Welland	83,000	North via Hwy 140/East via Netherby Road 12.0%			
West Lincoln	38,370	North via Hwy 140/East via Netherby Road 5.5%	North via Hwy 140/East via RR 27 20%	North via Hwy 140/East via RR 27	15%
St. Catharines	171,890	North via Hwy 140/West via RR 27 24.8%			
Wainfleet	7,730	North via Hwy 140/East via Netherby Road 1.1%			
Thorold	39,690	North via Hwy 140/West via RR 27 5.7%			
Total	694,000	100%	100%		100%

*Niagara Region 2022 Official Plan Estimates





Phase 1-3 Alternative Site Generated Volumes

Highway 140 & Kleinsmith Road, Port Colborne, TIA
230726

Figure 3.4

4 Future Traffic Conditions

To remain consistent with MTO traffic impact study guidelines, the horizon years of 2026 (Phase 1), 2031 (Phase 1-2), 2036 (Phase 1-3), 2036 (Phase 1-3), and 2041 (5 years after Full Build-Out) have been utilized for analysis of future traffic conditions.

4.1 Road Network Improvements

As noted in **Section 3.1.2**, the intersection of Kleinsmith Road at Highway 140 is proposed to be closed to allow the new Public Access Road to Highway 140 for the site. As a result, all traffic to/from Kleinsmith Road was redistributed to the new Public Access Road in the total traffic scenario.

4.2 Background Traffic Forecast

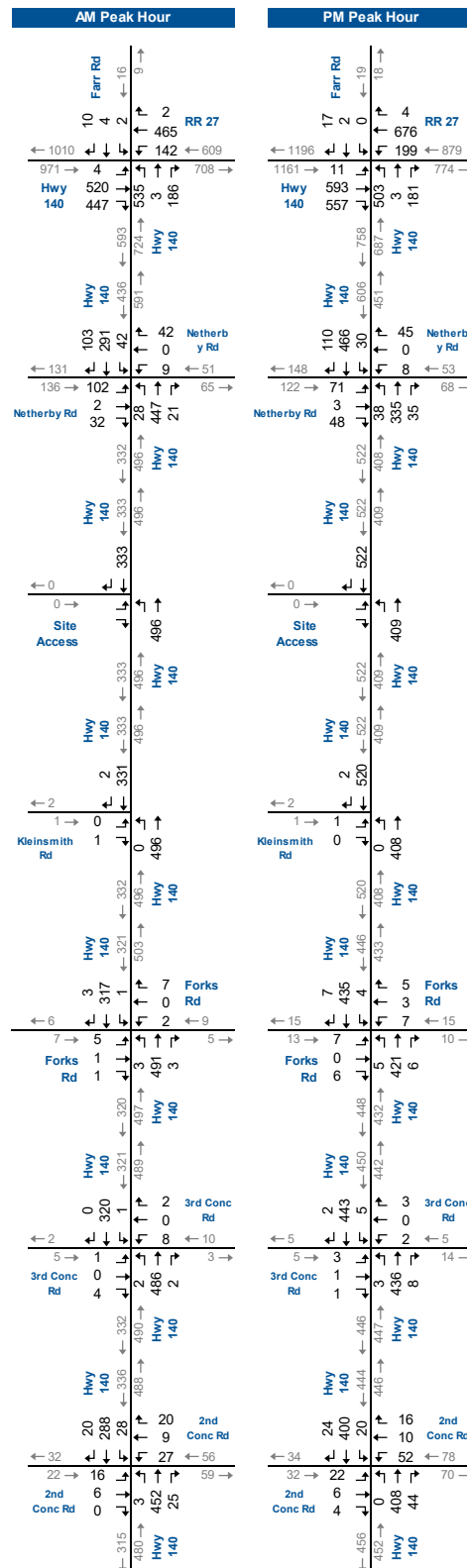
Horizon years assessed include 2026, 2031, 2036 and 2041. The future background traffic volumes have been estimated by applying a growth rate of 2% compounded per annum to the existing traffic volumes.

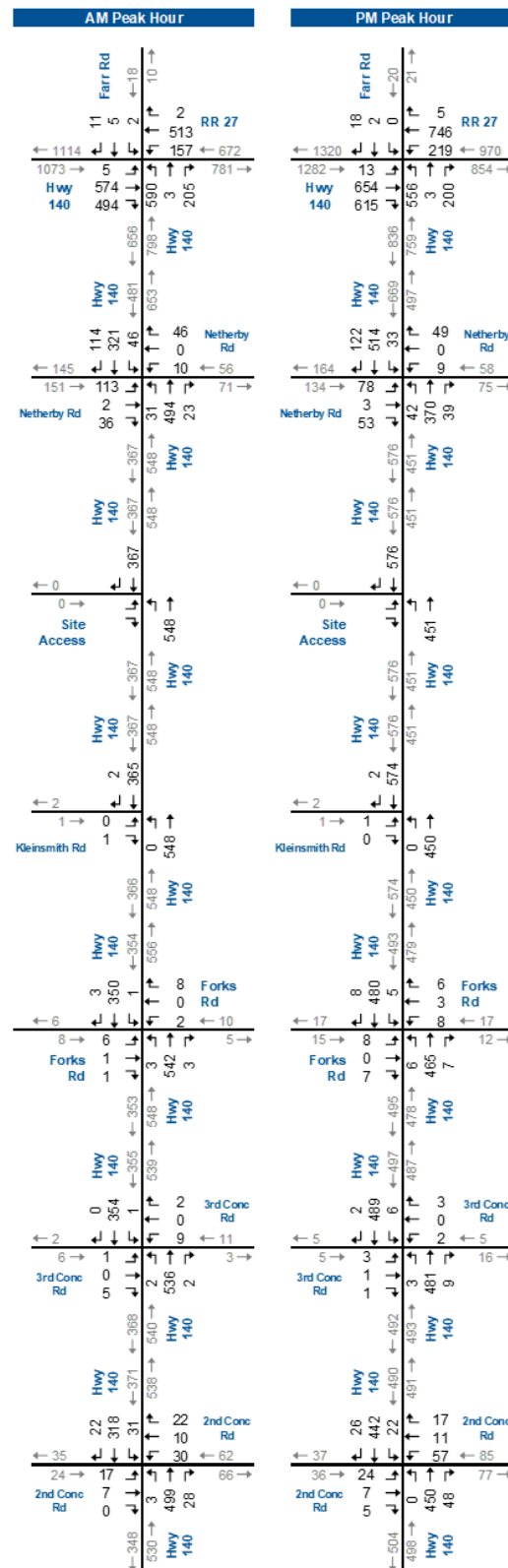
City of Port Colborne staff indicated a water ski club was permitted in 2019 at 1133 Forks Road. As this is seasonal and likely to operate with peak periods outside the weekday AM and PM peak hours, it was not included in the background traffic. It is assumed that the generalized growth rate would capture traffic generated by off-peak period traffic for this development and any other developments. **Figures 4.1 - 4.4** illustrate the Background traffic volumes.

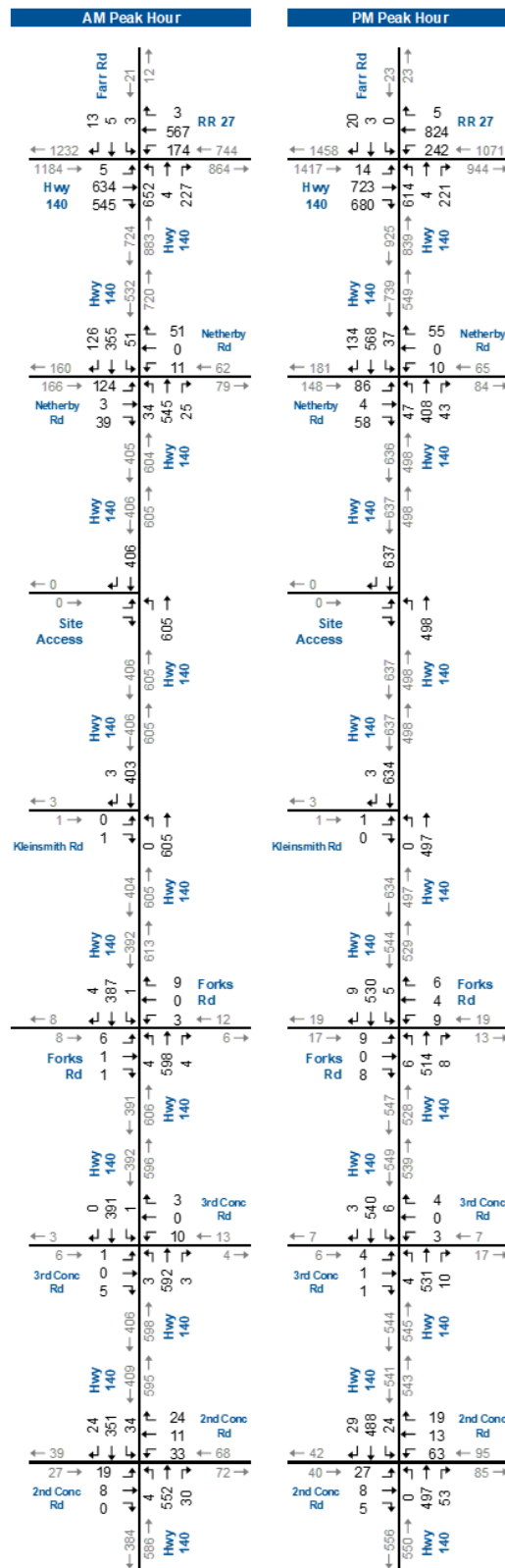
4.3 Total Projections

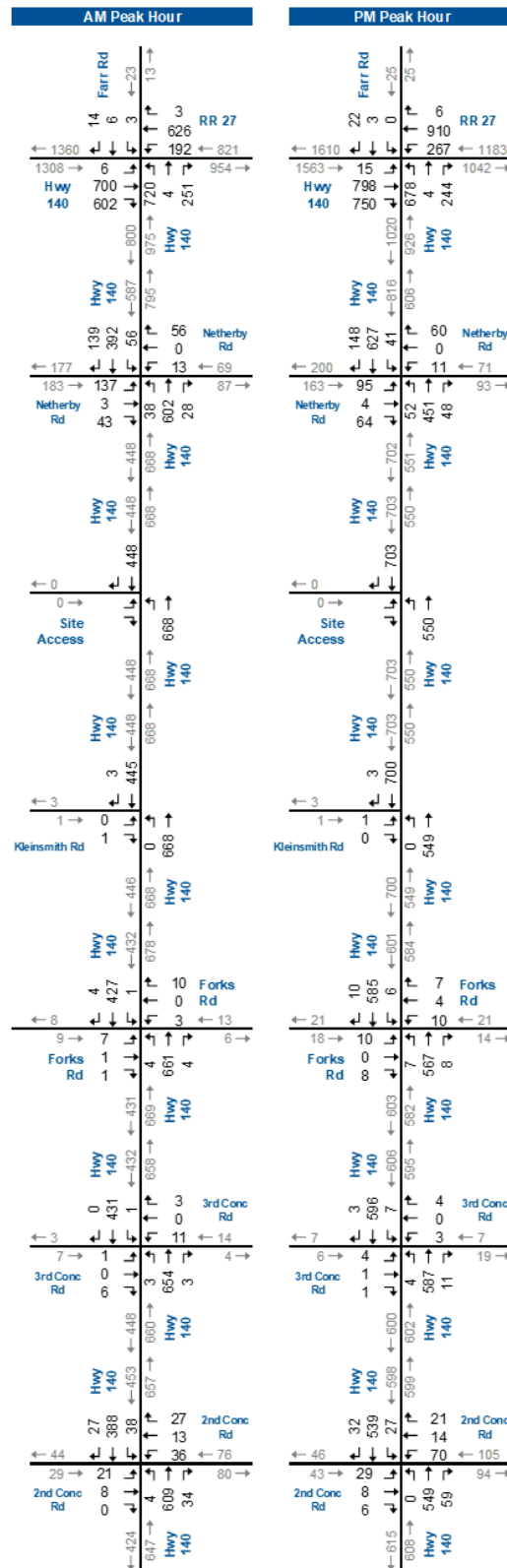
The projected site-generated traffic volumes were added to the Background projections to develop the Total traffic volumes. **Figures 4.5 - 4.10** illustrate the Total traffic volumes.

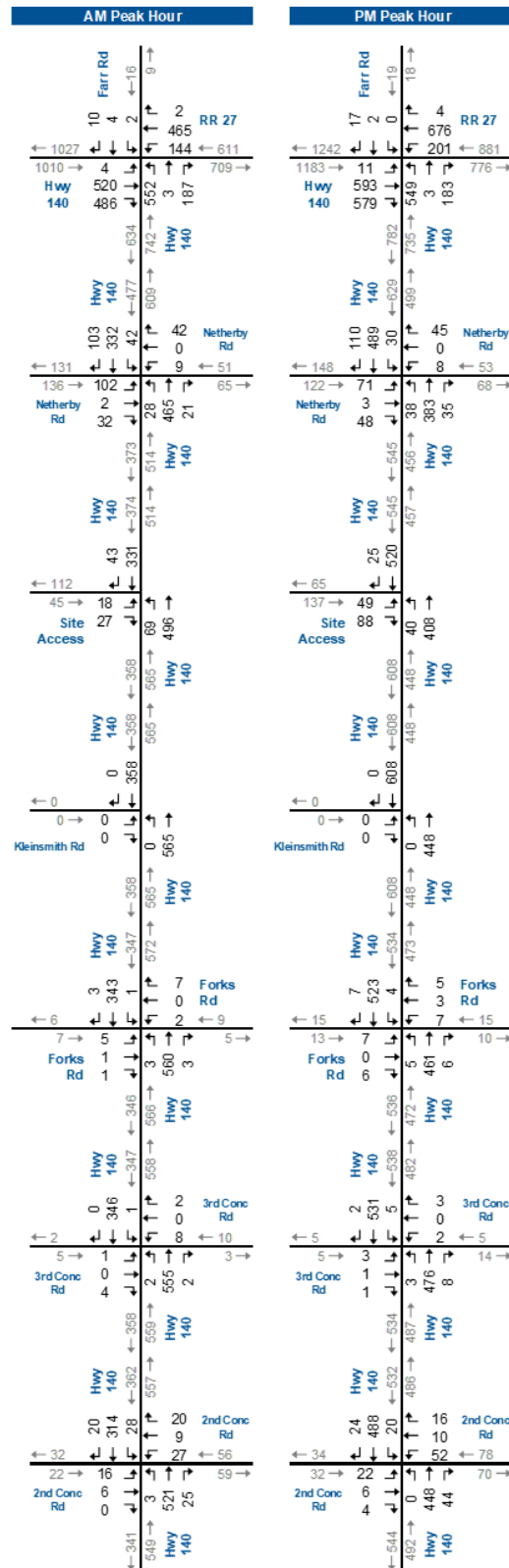




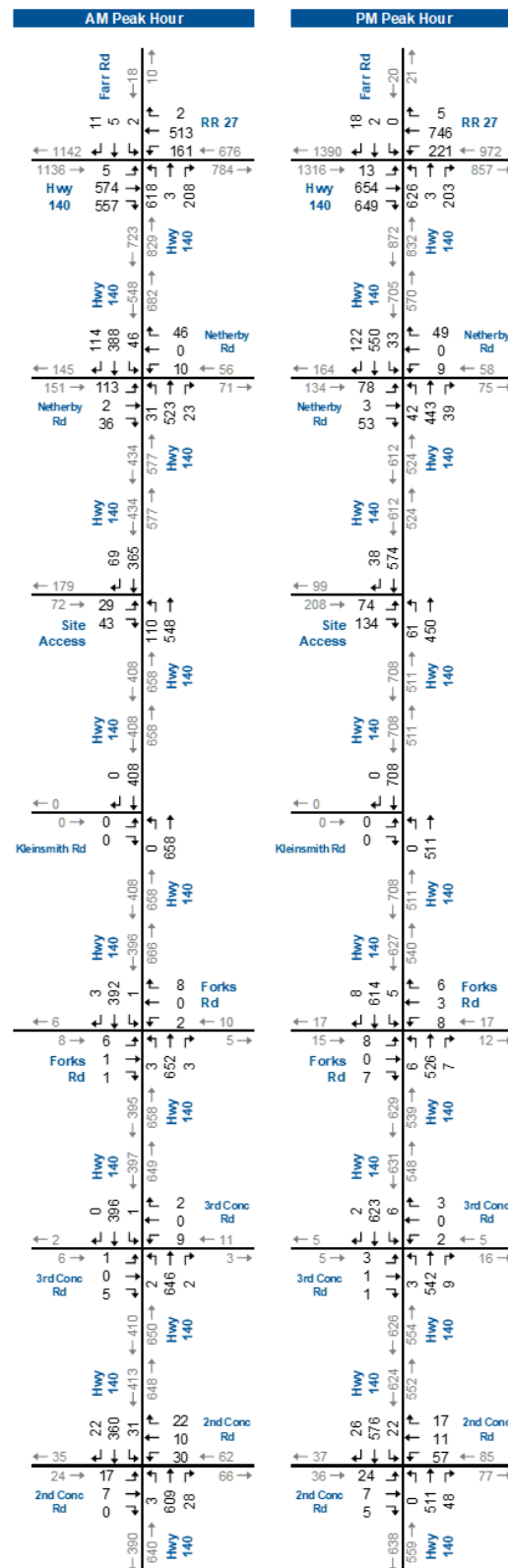


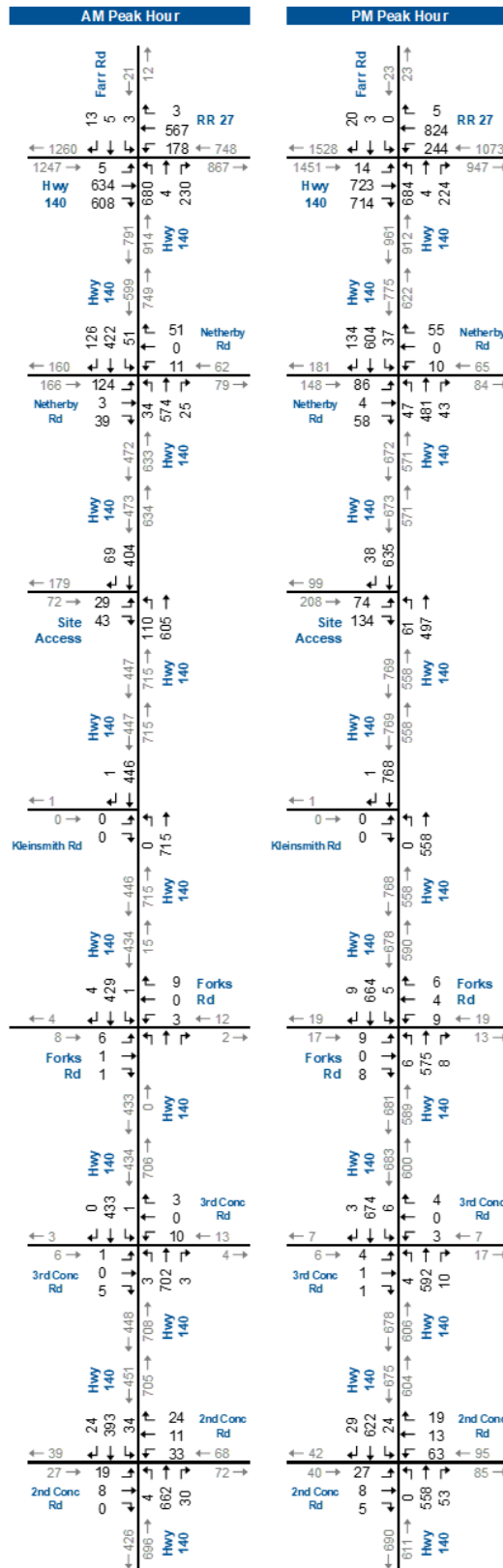


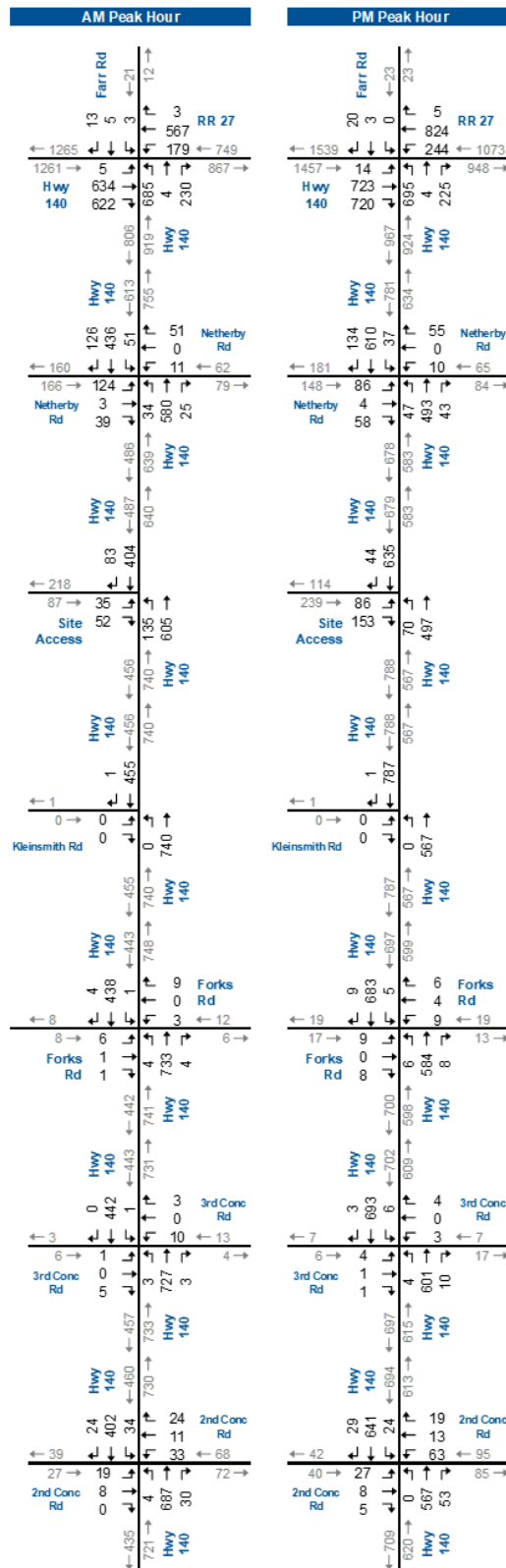




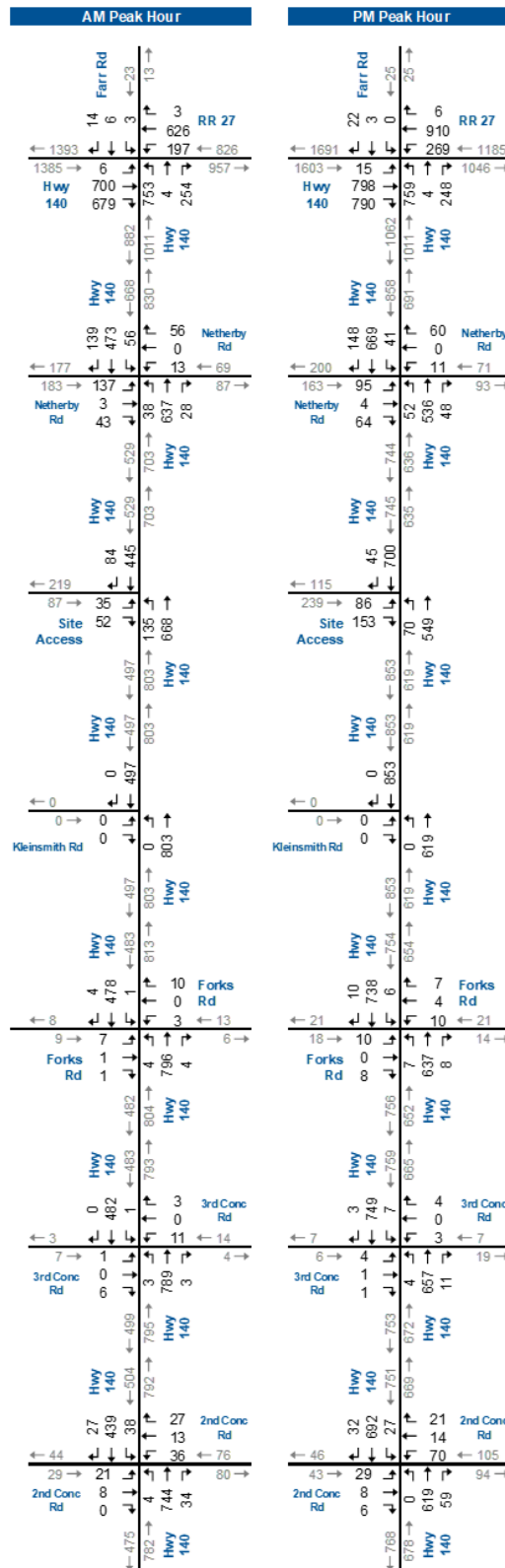
2026 Total (PH 1) Traffic Volumes

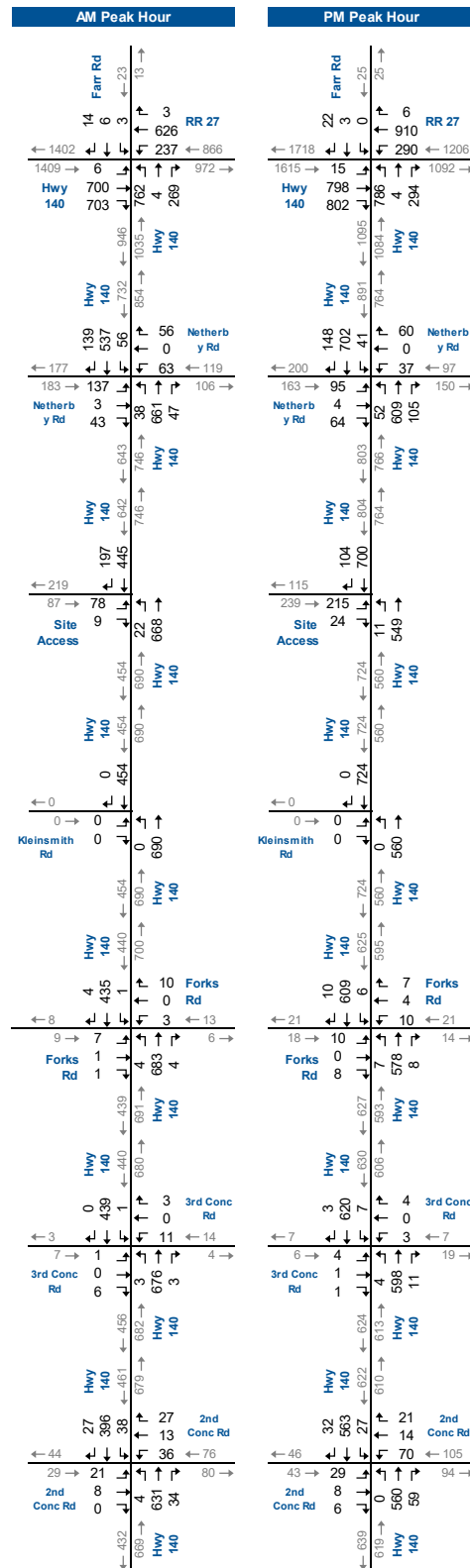






2036 Total (PH 1-3) Traffic Volumes





5 Operational Assessment

5.1 Level of Service Criteria

Level of service (LOS) is used to denote the different operating conditions that occur on a given roadway segment under various traffic volume loads. It is a qualitative measure that indexes the operational qualities of a roadway segment or an intersection with designations ranging from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions.

For signalized intersections, the analysis considered the operation of each lane or lane group entering the intersection and the level of service for the overall conditions at the intersection. At signalized intersections, intersections with movements operating with a v/c ratio of 0.85 or less are classified as within capacity, a v/c ratio of 0.86-1.00 as approaching capacity and a v/c ratio over 1.00 as exceeding capacity.

For unsignalized intersections, the analysis assumes that traffic on the mainline is not affected by the traffic on the side streets. The level of service is only determined for left turns from the main street and all movements from the minor street. At unsignalized intersections, an overall LOS between A-C is classified as tolerable delays; an overall LOS D-E is classified as an increased delay and an overall LOS F is classified as Significant Delays.

The evaluation criteria for analyzing signalized and unsignalized intersections are based on the 2000 Highway Capacity Manual (HCM)¹⁵.

Roundabouts are analyzed similarly to unsignalized intersections where the turning movements and not the overall intersection operations are analyzed. Level of service is determined using ARCADY 8 software. This is preferable for rotary (roundabout) analysis as it yields approach delays which Synchro does not.

¹⁵ Transportation Research Board, Highway Capacity Manual, Washing, D.C. 2003.



5.2 Intersection Capacity Analysis

Intersection capacity analyses were conducted at all intersections in the study area. Analyses were conducted for the Base Conditions as well as the 2026 (Phase 1), 2031 (Phase 1-2), 2036 (Phase 1-2), 2036 (Phase 1-3), and 2041 (5 years after Full Build-Out) Background and Total Conditions.

Tables 5.1 – 5.7 summarize the capacity analyses for the study area intersections for all horizon years. The capacity analysis results are included in **Appendix E**. The following sub-sections outline the operations of the study area intersections.

5.2.1 Highway 140 at Regional Road 27

2024 Base Year Operations	Approaching Capacity	●
2026 Background Operations	Approaching Capacity	●
2026 Total Operations	Approaching Capacity	●
2031 Background Operations	Exceeding Capacity	●
2031 Total Operations PH1	Exceeding Capacity	●
2036 Background Operations	Exceeding Capacity	●
2036 Total Operations PH2	Exceeding Capacity	●
2036 Total Operations PH3	Exceeding Capacity	●
2041 Background Operations	Exceeding Capacity	●
2041 Total Operations PH3	Exceeding Capacity	●
2041 Total Operations PH3 (Alternative)	Exceeding Capacity	●

Individual movements at the signalized intersection of Highway 140 and Regional Road 27 presently operate at LOS D or better during the weekday peak hours. The northbound left turn lane currently operates with a v/c ratio of 0.89 during the weekday PM peak hours.

Under the 2026 Background Horizon, the westbound left turn lane is forecast to experience further delays with a v/c ratio degrading to 0.86 during the weekday PM peak hour.

Under the 2031 Background Horizon, the westbound left-turn will degrade to LOS E with a v/c ratio exceeding 0.90 during the weekday AM peak hour. Further degradation is anticipated for the westbound and northbound left-turn movements under the 2031 and 2041 background horizons, with operations likely reaching LOS E and ultimately to LOS F with a v/c ratio exceeding 1.00 during the weekday peak hours. Additionally, under the 2036 Background Horizon, the eastbound through lane is forecast to experience delays in the LOS D range with a v/c ratio of 0.87 during the AM peak hour and is expected to worsen to LOS E with a v/c ratio greater than 0.95.



Similar levels of operation are forecasted between future background and total traffic conditions, with an added delay for the northbound left-turn movement. With respect to the alternative distribution assumptions, an increase in delay is proposed for the overcapacity movements (westbound and northbound left turn movements). However, the analysis remains fundamentally unchanged.

Critical Movements (v/c over 0.85)

- ▶ Northbound Left (2024 Existing)
- ▶ Westbound Left (2026 Background)
- ▶ Eastbound Through (2036 Background)



TABLE 5.1: INTERSECTION OPERATIONS – (1 OF 7)

Analysis Period	Intersection	Control Type	Horizon	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	1 - Highway 140 at Regional Road 27	TCS	Existing	LOS Delay V/C Q	D 35 0.02 3	D 43 0.68 82	D 37 0.35 33	D 40	D 45 0.75 45	C 31 0.46 69	C 31 0.46 69	C 34	C 31 0.82 152	B 13 0.14 10	B 13 0.14 10	C 26	B 11 0.00 1	B 11 0.01 3	B 11 0.01 3	B 11	C 34 0.78	
			2026 Background	LOS Delay V/C Q	D 35 0.02 3	D 44 0.71 86	D 38 0.36 34	D 41	D 51 0.80 51	C 31 0.48 72	C 31 0.48 72	D 36	C 34 0.85 179	B 13 0.15 10	B 13 0.15 10	C 29	B 11 0.00 1	B 11 0.01 3	B 11 0.01 3	B 11	D 36 0.81	
			2026 Total	LOS Delay V/C Q	D 35 0.02 3	D 44 0.71 86	D 39 0.40 37	D 41	D 55 0.82 54	C 31 0.48 72	C 31 0.48 72	D 37	D 38 0.89 192	B 13 0.15 10	B 13 0.15 10	C 32	B 11 0.00 1	B 11 0.01 3	B 11 0.01 3	B 11	D 37 0.85	
			2031 Background	LOS Delay V/C Q	D 36 0.03 4	D 47 0.78 103	D 40 0.40 37	D 43	E 79 0.93 68	C 32 0.53 81	C 32 0.53 81	D 43	D 46 0.94 210	B 13 0.16 11	B 13 0.16 11	D 38	B 11 0.00 1	B 11 0.02 4	B 11 0.02 4	B 11	D 41 0.92	
			2031 Total	LOS Delay V/C Q	D 36 0.03 4	D 47 0.78 103	D 40 0.46 43	D 44	F 90 0.97 72	C 32 0.53 81	C 32 0.53 81	D 46	E 61 1.00 233	B 13 0.17 11	B 13 0.17 11	D 49	B 11 0.00 1	B 11 0.02 4	B 11 0.02 4	B 11	D 46 0.97	
			2036 Background	LOS Delay V/C Q	D 36 0.04 4	D 53 0.87 121	D 40 0.44 40	D 47	F 108 1.03 78	C 33 0.59 90	C 33 0.59 90	D 51	E 71 1.04 245	B 13 0.18 11	B 13 0.18 11	E 56	B 11 0.01 2	B 11 0.02 4	B 11 0.02 4	B 11	D 50 1.02	
			2036 Total PH2	LOS Delay V/C Q	D 36 0.04 4	D 53 0.87 121	D 42 0.51 47	D 47	F 121 1.08 83	C 33 0.59 90	C 33 0.59 90	D 55	F 92 1.10 267	B 13 0.19 12	B 13 0.19 12	E 72	B 11 0.01 2	B 11 0.02 4	B 11 0.02 4	B 11	E 57 1.07	
			2036 Total PH3	LOS Delay V/C Q	D 36 0.04 4	D 53 0.87 121	D 42 0.52 51	D 47	F 124 1.09 84	C 33 0.59 90	C 33 0.59 90	E 56	F 97 1.12 272	B 13 0.19 11	B 13 0.19 11	E 76	B 11 0.01 2	B 11 0.02 4	B 11 0.02 4	B 11	E 58 1.08	
			2041 Background	LOS Delay V/C Q	D 38 0.06 4	D 65 0.96 140	D 41 0.49 45	D 54	F 143 1.14 90	C 35 0.65 101	C 35 0.65 101	E 60	F 111 1.15 284	B 13 0.20 12	B 13 0.20 12	F 85	B 11 0.01 2	B 11 0.02 4	B 11 0.02 4	B 11	E 65 1.12	
			2041 Total PH3	LOS Delay V/C Q	D 38 0.06 4	D 65 0.96 140	D 44 0.57 80	D 54	F 160 1.19 96	C 35 0.65 101	C 35 0.65 101	E 65	F 141 1.23 310	B 13 0.21 12	B 13 0.21 12	F 109	B 11 0.01 2	B 11 0.02 4	B 11 0.02 4	B 11	E 74 1.19	
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	D 38 0.06 4	D 65 0.96 140	D 44 0.59 83	A 0	F 256 1.43 121	C 35 0.65 101	C 35 0.65 101	A 0	F 147 1.24 315	B 13 0.22 12	B 13 0.22 12	A 0	B 11 0.01 2	B 11 0.02 4	B 11 0.02 4	A 0	F 83 1.28	
PM Peak Hour	1 - Highway 140 at Regional Road 27	TCS	Existing	LOS Delay V/C Q	C 31 0.07 5	C 33 0.57 84	C 31 0.41 30	C 32	D 42 0.80 60	C 26 0.54 93	C 26 0.54 93	C 30	D 46 0.89 173	B 17 0.14 12	B 17 0.14 12	D 38	A 16 0.00 0	B 16 0.02 4	B 16 0.02 4	B 16	C 33 0.83	
			2026 Background	LOS Delay V/C Q	C 31 0.08 5	C 33 0.59 87	C 31 0.42 31	C 32	D 51 0.86 67	C 27 0.56 97	C 27 0.56 97	C 32	D 52 0.93 185	B 17 0.15 12	B 17 0.15 12	D 42	A 16 0.00 0	B 16 0.02 4	B 16 0.02 4	B 16	C 35 0.88	
			2026 Total	LOS Delay V/C Q	C 31 0.08 5	C 33 0.59 87	C 32 0.44 33	C 33	D 54 0.87 69	C 27 0.56 97	C 27 0.56 97	C 33	E 74 1.03 214	B 17 0.15 13	B 17 0.15 13	E 60	A 16 0.00 0	B 16 0.02 4	B 16 0.02 4	B 16	D 40 0.94	
			2031 Background	LOS Delay V/C Q	C 29 0.10 6	C 35 0.66 98	C 33 0.47 34	C 34	F 102 1.05 87	C 30 0.64 110	C 30 0.64 110	D 46	E 72 1.02 214	B 17 0.16 13	B 17 0.16 13	E 57	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	D 44 1.01	
			2031 Total	LOS Delay V/C Q	C 29 0.10 6	C 35 0.66 98	C 34 0.50 37	C 35	F 108 1.07 90	C 30 0.64 110	C 30 0.64 110	D 48	F 122 1.17 259	B 17 0.17 13	B 17 0.17 13	F 96	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	E 55 1.10	
			2036 Background	LOS Delay V/C Q	C 29 0.13 6	C 38 0.73 111	C 34 0.52 39	C 36	F 187 1.28 110	C 32 0.71 125	C 32 0.71 125	E 67	F 107 1.13 247	B 18 0.19 15	B 18 0.19 15	F 83	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	E 57 1.17	
			2036 Total PH2	LOS Delay V/C Q	C 29 0.13 6	C 38 0.73 111	C 35 0.55 41	C 36	F 195 1.30 112	C 32 0.71 125	C 32 0.71 125	E 69	F 166 1.28 292	B 18 0.20 16	B 18 0.20 16	F 129	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	E 71 1.26	
			2036 Total PH3	LOS Delay V/C Q	C 29 0.13 6	C 38 0.73 111	C 35 0.56 43	C 36	F 195 1.30 112	C 32 0.71 125	C 32 0.71 125	E 69	F 178 1.30 300	B 18 0.20 16	B 18 0.20 16	F 138	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	E 74 1.27	
			2041 Background	LOS Delay V/C Q	C 30 0.18 6	C 41 0.81 127	D 36 0.57 44	D 38	F 296 1.54 134	C 34 0.78 153	C 34 0.78 153	F 93	F 155 1.25 283	B 18 0.24 21	B 18 0.24 21	F 119	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	E 76 1.35	
			2041 Total PH3	LOS Delay V/C Q	C 30 0.18 6	C 41 0.81 127	D 37 0.61 49	D 39	F 308 1.57 137	C 34 0.78 153	C 34 0.78 153	F 97	F 229 1.42 335	B 18 0.25 23	B 18 0.25 23	F 177	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	B 16	F 93 1.45	
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	C 30 0.18 6	C 41 0.81 127	D 37 0.62 50	A 0	F 358 1.69 149	C 34 0.78 153	C 34 0.78 153	A 0	F 251 1.47 350	B 19 0.32 34	B 19 0.32 34	A 0	A 16 0.00 0	B 16 0.02 5	B 16 0.02 5	A 0	F 103 1.53	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWS - All-Way Stop Control

RBT - Roundabout



5.2.2 Highway 140 at Netherby Road

2024 Base Year Operations	Tolerable Delays	●
2026 Background Operations	Tolerable Delays	●
2026 Total Operations	Tolerable Delays	●
2031 Background Operations	Tolerable Delays	●
2031 Total Operations PH1	Tolerable Delays	●
2036 Background Operations	Tolerable Delays	●
2036 Total Operations PH2	Tolerable Delays	●
2036 Total Operations PH3	Tolerable Delays	●
2041 Background Operations	Tolerable Delays	●
2041 Total Operations PH3	Tolerable Delays	●
2041 Total Operations PH3 (Alternative)	Tolerable Delays	●

Individual movements at the roundabout at Highway 140 and Netherby Road presently operate at LOS A during the weekday peak hours. Under the 2026, 2031, 2036 and 2041 Background and Total horizons, similar operations are projected with all movement expected to continue operating at LOS C or better with a v/c ratio less than 0.85.

With respect to the alternative distribution assumptions, the operations have not changed.

Critical Movements (LOS E/F)

- ▶ None



TABLE 5.2: INTERSECTION OPERATIONS – (2 OF 7)

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach															
					Eastbound				Westbound				Northbound				Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	2 - Highway 140 at Netherby Road	RBT	Existing	LOS Delay V/C Q(PCE)	< 5 0.15 1	> 5 1	> 5 1	A 5	< 6 0.07 1	> 6 1	> 6 1	A 6	< 7 0.49 1	> 7 1	> 7 1	A 7	< 8 0.41 1	> 8 1	> 8 1	A 8
			2026 Background	LOS Delay V/C Q(PCE)	< 5 0.16 1	> 5 1	> 5 1	A 5	< 6 0.07 1	> 6 1	> 6 1	A 6	< 8 0.51 1	> 8 1	> 8 1	A 8	< 6 0.42 1	> 6 1	> 6 1	A 6
			2026 Total	LOS Delay V/C Q(PCE)	< 5 0.17 1	> 5 1	> 5 1	A 5	< 6 0.07 1	> 6 1	> 6 1	A 6	< 8 0.54 1	> 8 1	> 8 1	A 8	< 7 0.48 1	> 7 1	> 7 1	A 7
			2031 Background	LOS Delay V/C Q(PCE)	< 5 0.18 1	> 5 1	> 5 1	A 5	< 6 0.08 1	> 6 1	> 6 1	A 6	< 9 0.57 1	> 9 1	> 9 1	A 9	< 7 0.47 1	> 7 1	> 7 1	A 7
			2031 Total	LOS Delay V/C Q(PCE)	< 5 0.19 1	> 5 1	> 5 1	A 5	< 6 0.09 1	> 6 1	> 6 1	A 6	< 10 0.62 1	> 10 1	> 10 1	A 10	< 8 0.55 1	> 8 1	> 8 1	A 8
			2036 Background	LOS Delay V/C Q(PCE)	< 5 0.19 1	> 5 1	> 5 1	A 5	< 6 0.09 1	> 6 1	> 6 1	A 6	< 9 0.60 1	> 9 1	> 9 1	A 9	< 7 0.49 1	> 7 1	> 7 1	A 7
			2036 Total PH2	LOS Delay V/C Q(PCE)	< 5 0.20 1	> 5 1	> 5 1	A 5	< 6 0.09 1	> 6 1	> 6 1	A 6	< 10 0.64 2	> 10 1	> 10 1	A 10	< 8 0.57 1	> 8 1	> 8 1	A 8
			2036 Total PH3	LOS Delay V/C Q(PCE)	< 5 0.21 1	> 5 1	> 5 1	A 5	< 6 0.09 1	> 6 1	> 6 1	A 6	< 10 0.65 2	> 10 1	> 10 1	A 10	< 8 0.59 1	> 8 1	> 8 1	A 8
			2041 Background	LOS Delay V/C Q(PCE)	< 5 0.22 1	> 5 1	> 5 1	A 5	< 6 0.10 1	> 6 1	> 6 1	A 6	< 11 0.67 3	> 11 1	> 11 1	B 11	< 7 0.54 1	> 7 1	> 7 1	A 7
			2041 Total PH3	LOS Delay V/C Q(PCE)	< 6 0.23 1	> 6 1	> 6 1	A 6	< 7 0.11 1	> 7 1	> 7 1	A 7	< 13 0.72 6	> 13 1	> 13 1	B 13	< 9 0.64 2	> 9 1	> 9 1	A 9
			2041 Total PH3 (Alternative)	LOS Delay V/C Q(PCE)	< 6 0.23 1	> 6 1	> 6 1	A 6	< 7 0.11 1	> 7 1	> 7 1	A 7	< 13 0.72 6	> 13 1	> 13 1	B 13	< 9 0.64 2	> 9 1	> 9 1	A 9
			2041 Total PH3 (Alternative)	LOS Delay V/C Q(PCE)	< 6 0.23 1	> 6 1	> 6 1	A 6	< 7 0.11 1	> 7 1	> 7 1	A 7	< 13 0.72 6	> 13 1	> 13 1	B 13	< 9 0.64 2	> 9 1	> 9 1	A 9
PM Peak Hour	2 - Highway 140 at Netherby Road	RBT	Existing	LOS Delay V/C Q(PCE)	< 5 0.15 1	> 5 1	> 5 1	A 5	< 6 0.06 1	> 6 1	> 6 1	A 5	< 6 0.40 1	> 6 1	> 6 1	A 6	< 8 0.57 1	> 8 1	> 8 1	A 8
			2026 Background	LOS Delay V/C Q(PCE)	< 5 0.16 1	> 5 1	> 5 1	A 5	< 6 0.07 1	> 6 1	> 6 1	A 5	< 6 0.41 1	> 6 1	> 6 1	A 6	< 8 0.59 1	> 8 1	> 8 1	A 8
			2026 Total	LOS Delay V/C Q(PCE)	< 5 0.16 1	> 5 1	> 5 1	A 5	< 6 0.07 1	> 6 1	> 6 1	A 5	< 6 0.47 1	> 6 1	> 6 1	A 7	< 9 0.62 1	> 9 1	> 9 1	A 9
			2031 Background	LOS Delay V/C Q(PCE)	< 5 0.18 1	> 5 1	> 5 1	A 6	< 6 0.08 1	> 6 1	> 6 1	A 6	< 7 0.47 1	> 7 1	> 7 1	A 7	< 10 0.66 2	> 10 1	> 10 1	A 10
			2031 Total	LOS Delay V/C Q(PCE)	< 5 0.19 1	> 5 1	> 5 1	A 6	< 6 0.08 1	> 6 1	> 6 1	A 6	< 8 0.55 1	> 8 1	> 8 1	A 8	< 11 0.70 4	> 11 1	> 11 1	A 11
			2036 Background	LOS Delay V/C Q(PCE)	< 5 0.20 1	> 5 1	> 5 1	A 6	< 6 0.08 1	> 6 1	> 6 1	A 5	< 6 0.48 1	> 6 1	> 6 1	A 6	< 10 0.69 3	> 10 1	> 10 1	A 10
			2036 Total PH2	LOS Delay V/C Q(PCE)	< 5 0.20 1	> 5 1	> 5 1	A 6	< 6 0.09 1	> 6 1	> 6 1	A 6	< 8 0.56 1	> 8 1	> 8 1	A 8	< 12 0.73 6	> 12 1	> 12 1	A 12
			2036 Total PH3	LOS Delay V/C Q(PCE)	< 5 0.21 1	> 5 1	> 5 1	A 6	< 6 0.09 1	> 6 1	> 6 1	A 6	< 8 0.58 1	> 8 1	> 8 1	A 8	< 12 0.74 6	> 12 1	> 12 1	A 12
			2041 Background	LOS Delay V/C Q(PCE)	< 5 0.23 1	> 5 1	> 5 1	A 6	< 6 0.09 1	> 6 1	> 6 1	A 6	< 7 0.54 1	> 7 1	> 7 1	A 7	< 13 0.76 8	> 13 1	> 13 1	A 13
			2041 Total PH3	LOS Delay V/C Q(PCE)	< 7 0.24 1	> 7 1	> 7 1	A 7	< 6 0.10 1	> 6 1	> 6 1	A 6	< 9 0.63 2	> 9 1	> 9 1	A 9	< 16 0.81 13	> 16 1	> 16 1	C 16
			2041 Total PH3 (Alternative)	LOS Delay V/C Q(PCE)	< 7 0.24 1	> 7 1	> 7 1	A 7	< 6 0.10 1	> 6 1	> 6 1	A 6	< 9 0.63 2	> 9 1	> 9 1	A 9	< 16 0.81 13	> 16 1	> 16 1	C 16
			2041 Total PH3 (Alternative)	LOS Delay V/C Q(PCE)	< 7 0.24 1	> 7 1	> 7 1	A 7	< 6 0.10 1	> 6 1	> 6 1	A 6	< 9 0.63 2	> 9 1	> 9 1	A 9	< 16 0.81 13	> 16 1	> 16 1	C 16
			2041 Total PH3 (Alternative)	LOS Delay V/C Q(PCE)	< 7 0.24 1	> 7 1	> 7 1	A 7	< 6 0.10 1	> 6 1	> 6 1	A 6	< 9 0.63 2	> 9 1	> 9 1	A 9	< 16 0.81 13	> 16 1	> 16 1	C 16

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex - Existing Available Storage
Avail. - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout



5.2.3 Highway 140 at Kleinsmith Road

2024 Base Year Operations	Tolerable Delays	●
2026 Background Operations	Tolerable Delays	●
2031 Background Operations	Tolerable Delays	●
2036 Background Operations	Tolerable Delays	●
2041 Background Operations	Tolerable Delays	●

Individual movements at the unsignalized intersection of Highway 140 and Kleinsmith Road presently operate at LOS C or better during the weekday peak hours. Under the 2026, 2031, 2036 and 2041 Background horizons, the stop-controlled eastbound approach is projected to operate at LOS D or better, with a v/c ratio no greater than 0.02.

With respect to the alternative distribution assumptions, the operations have not changed.

Critical Movements (LOS E/F)

- ▶ None



TABLE 5.3: INTERSECTION OPERATIONS - (3 OF 7)

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach															
					Eastbound				Westbound				Northbound				Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	3 - Highway 140 at Kleinsmith Road	TWSC	Existing	LOS Delay V/C Q	B 10 0.00 0		B 10 0.00 0	B 10					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.20 0	A 0 0.00 0	A 0
			2026 Background	LOS Delay V/C Q	B 10 0.00 0		B 10 0.00 0	B 10					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.21 0	A 0 0.00 0	A 0
			2031 Background	LOS Delay V/C Q	B 11 0.00 0		B 11 0.00 0	B 11					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.23 0	A 0 0.00 0	A 0
			2036 Background	LOS Delay V/C Q	B 11 0.00 0		B 11 0.00 0	B 11					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.26 0	A 0 0.00 0	A 0
			2041 Background	LOS Delay V/C Q	B 11 0.00 0		B 11 0.00 0	B 11					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.28 0	A 0 0.00 0	A 0
PM Peak Hour	3 - Highway 140 at Kleinsmith Road	TWSC	Existing	LOS Delay V/C Q	C 18 0.00 0		C 18 0.00 0	C 18					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.32 0	A 0 0.00 0	A 0
			2026 Background	LOS Delay V/C Q	C 18 0.00 0		C 18 0.00 0	C 18					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.33 0	A 0 0.00 0	A 0
			2031 Background	LOS Delay V/C Q	C 21 0.00 0		C 21 0.00 0	C 21					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.37 0	A 0 0.00 0	A 0
			2036 Background	LOS Delay V/C Q	C 23 0.01 0		C 23 0.01 0	C 23					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.41 0	A 0 0.00 0	A 0
			2041 Background	LOS Delay V/C Q	D 27 0.01 0		D 27 0.01 0	D 27					A 0 0.00 0	A 0 0.00 0		A 0		A 0 0.45 0	A 0 0.00 0	A 0

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex. - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout



5.2.4 Highway 140 at Forks Road

2024 Base Year Operations	Tolerable Delays	●
2026 Background Operations	Tolerable Delays	●
2026 Total Operations	Tolerable Delays	●
2031 Background Operations	Tolerable Delays	●
2031 Total Operations PH1	Increased Delays	●
2036 Background Operations	Increased Delays	●
2036 Total Operations PH2	Increased Delays	●
2036 Total Operations PH3	Increased Delays	●
2041 Background Operations	Increased Delays	●
2041 Total Operations PH3	Increased Delays	●
2041 Total Operations PH3 (Alternative)	Increased Delays	●

Individual movements at the unsignalized intersection of Highway 140 and Forks Road presently operate at LOS C or better during the weekday peak hours.

Similar operations are projected under the 2026 and 2031 Background Horizons. However, under the 2036 Background Horizon, the eastbound approach is expected to degrade to LOS D with a v/c ratio no greater than 0.05 during the weekday AM peak hour. Under the 2041 Background Horizon, the eastbound and westbound approach is expected to degrade to LOS D with a v/c ratio less than 0.15 during the weekday PM peak hour.

Regarding development traffic implications, similar levels of operation are expected under the Total conditions with site-generated traffic volumes. However, under the 2031, 2036 and 2041 Total Horizon, the eastbound approach will degrade to LOS D and ultimately to LOS E with a v/c ratio less than 0.20 during the weekday peak hours. By the 2041 Total Horizon, the westbound approach is also anticipated to degrade to LOS E with a v/c ratio less than 0.20 during the PM peak hour.

As the intersection is projected to have a v/c ratio of less than 0.20, it is operating at 20% or less of its available capacity. As a result, mitigation measures are not proposed for this intersection.

With respect to the alternative distribution assumptions, the operations have not changed; rather, a slight decrease in delay is projected for the stop-controlled approaches.

Critical Movements (LOS E/F)

- ▶ Eastbound Approach (2041 Total)
- ▶ Westbound Approach (2041 Total)



TABLE 5.4: INTERSECTION OPERATIONS– (4 OF 7)

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach															
					Eastbound				Westbound				Northbound				Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	4 - Highway 140 at Forks Road	TWSC	Existing	LOS Delay V/C Q	C 19 0.03 1	C 19 0.03 1	C 19 0.03 1	C 19	B 13 0.02 1	B 13 0.02 1	B 13 0.02 1	B 13	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Background	LOS Delay V/C Q	C 19 0.03 1	C 19 0.03 1	C 19 0.03 1	C 19	B 13 0.02 1	B 13 0.02 1	B 13 0.02 1	B 13	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Total	LOS Delay V/C Q	C 22 0.03 1	C 22 0.03 1	C 22 0.03 1	C 22	B 14 0.02 1	B 14 0.02 1	B 14 0.02 1	B 14	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2031 Background	LOS Delay V/C Q	C 22 0.04 1	C 22 0.04 1	C 22 0.04 1	C 22	B 14 0.03 1	B 14 0.03 1	B 14 0.03 1	B 14	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2031 Total	LOS Delay V/C Q	D 28 0.05 1	D 28 0.05 1	D 28 0.05 1	D 28	C 16 0.03 1	C 16 0.03 1	C 16 0.03 1	C 16	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2036 Background	LOS Delay V/C Q	D 26 0.05 1	D 26 0.05 1	D 26 0.05 1	D 26	C 16 0.04 1	C 16 0.04 1	C 16 0.04 1	C 16	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2036 Total PH2	LOS Delay V/C Q	D 32 0.06 2	D 32 0.06 2	D 32 0.06 2	D 32	C 18 0.05 1	C 18 0.05 1	C 18 0.05 1	C 18	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2036 Total PH3	LOS Delay V/C Q	D 34 0.07 2	D 34 0.07 2	D 34 0.07 2	D 34	C 19 0.05 1	C 19 0.05 1	C 19 0.05 1	C 19	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2041 Background	LOS Delay V/C Q	D 30 0.07 2	D 30 0.07 2	D 30 0.07 2	D 30	C 17 0.04 1	C 17 0.04 1	C 17 0.04 1	C 17	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2041 Total PH3	LOS Delay V/C Q	E 42 0.09 2	E 42 0.09 2	E 42 0.09 2	E 42	C 20 0.06 1	C 20 0.06 1	C 20 0.06 1	C 20	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	D 32 0.07 2	D 32 0.07 2	D 32 0.07 2	D 32	C 17 0.05 1	C 17 0.05 1	C 17 0.05 1	C 17	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
PM Peak Hour	4 - Highway 140 at Forks Road	TWSC	Existing	LOS Delay V/C Q	C 16 0.04 1	C 16 0.04 1	C 16 0.04 1	C 16	B 17 0.05 1	B 17 0.05 1	B 17 0.05 1	B 17	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Background	LOS Delay V/C Q	C 17 0.05 1	C 17 0.05 1	C 17 0.05 1	C 17	B 18 0.05 1	B 18 0.05 1	B 18 0.05 1	B 18	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Total	LOS Delay V/C Q	C 19 0.06 1	C 19 0.06 1	C 19 0.06 1	C 19	C 21 0.07 2	C 21 0.07 2	C 21 0.07 2	C 21	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2031 Background	LOS Delay V/C Q	C 19 0.06 2	C 19 0.06 2	C 19 0.06 2	C 19	C 19 0.07 2	C 19 0.07 2	C 19 0.07 2	C 19	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2031 Total	LOS Delay V/C Q	C 24 0.08 2	C 24 0.08 2	C 24 0.08 2	C 24	C 25 0.09 3	C 25 0.09 3	C 25 0.09 3	C 25	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2036 Background	LOS Delay V/C Q	C 21 0.08 2	C 21 0.08 2	C 21 0.08 2	C 21	C 23 0.09 3	C 23 0.09 3	C 23 0.09 3	C 23	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2036 Total PH2	LOS Delay V/C Q	D 28 0.11 3	D 28 0.11 3	D 28 0.11 3	D 28	D 30 0.13 3	D 30 0.13 3	D 30 0.13 3	D 30	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2036 Total PH3	LOS Delay V/C Q	D 29 0.11 3	D 29 0.11 3	D 29 0.11 3	D 29	C 31 0.13 4	C 31 0.13 4	C 31 0.13 4	C 31	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2041 Background	LOS Delay V/C Q	D 25 0.10 3	D 25 0.10 3	D 25 0.10 3	D 25	D 27 0.12 3	D 27 0.12 3	D 27 0.12 3	D 27	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2041 Total PH3	LOS Delay V/C Q	E 36 0.15 4	E 36 0.15 4	E 36 0.15 4	E 36	E 37 0.17 5	E 37 0.17 5	E 37 0.17 5	E 37	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	D 27 0.11 3	D 27 0.11 3	D 27 0.11 3	D 27	D 28 0.13 4	D 28 0.13 4	D 28 0.13 4	D 28	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.01 0	A 0

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex - Existing Available Storage

Avail - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout



5.2.5 Highway 140 at Concession 3 Road

2024 Base Year Operations	Tolerable Delays	●
2026 Background Operations	Tolerable Delays	●
2026 Total Operations	Tolerable Delays	●
2031 Background Operations	Tolerable Delays	●
2031 Total Operations PH1	Tolerable Delays	●
2036 Background Operations	Tolerable Delays	●
2036 Total Operations PH2	Increased Delays	●
2036 Total Operations PH3	Increased Delays	●
2041 Background Operations	Increased Delays	●
2041 Total Operations PH3	Increased Delays	●
2041 Total Operations PH3 (Alternative)	Increased Delays	●

Individual movements at the unsignalized intersection of Highway 140 and Concession 3 Road presently operate at LOS C or better during the weekday peak hours.

Similar operations are projected under the 2026 and 2036 Background Horizons. However, under the 2041 Background Horizons, delays are forecast to increase in the westbound and eastbound approach during the weekday AM and PM peak hours respectively. Delays are forecast to degrade to LOS D range with v/c ratios less than 0.10 for both movements.

Regarding development traffic implications, similar levels of operation are expected under the Total conditions with site-generated traffic volumes. However, under the 2036 and 2041 Total Horizons, the westbound approach is projected to degrade to LOS D and eventually LOS E with a v/c ratio less than 0.15 during the weekday AM peak hour. Furthermore, during the PM peak hour, the eastbound approach is forecast to degrade to LOS D and eventually LOS E maintaining a v/c ratio no greater than 0.10.

With respect to the alternative distribution assumptions, the operations have not changed; rather, a slight decrease in delay is projected for the stop-controlled approaches.

Critical Movements (LOS E/F)

- ▶ Eastbound Approach (2041 Total)
- ▶ Westbound Approach (2041 Total)



TABLE 5.5: INTERSECTION OPERATIONS– (5 OF 7)

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach															
					Eastbound				Westbound				Northbound				Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	5 - Highway 140 at Concession 3 Road	TWSC	Existing	LOS Delay V/C Q	B 12 0.01 0	B 12 0.01 0	B 12 0.01 0	B 12	C 17 0.04 1	C 17 0.04 1	C 17 0.04 1	C 17	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Background	LOS Delay V/C Q	B 12 0.01 0	B 12 0.01 0	B 12 0.01 0	B 12	C 18 0.04 1	C 18 0.04 1	C 18 0.04 1	C 18	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Total	LOS Delay V/C Q	B 13 0.01 0	B 13 0.01 0	B 13 0.01 0	B 13	C 20 0.04 1	C 20 0.04 1	C 20 0.04 1	C 20	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2031 Background	LOS Delay V/C Q	B 12 0.01 0	B 12 0.01 0	B 12 0.01 0	B 12	C 20 0.05 1	C 20 0.05 1	C 20 0.05 1	C 20	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2031 Total	LOS Delay V/C Q	B 13 0.01 0	B 13 0.01 0	B 13 0.01 0	B 13	C 25 0.06 2	C 25 0.06 2	C 25 0.06 2	C 25	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2036 Background	LOS Delay V/C Q	B 13 0.01 0	B 13 0.01 0	B 13 0.01 0	B 13	C 22 0.06 2	C 22 0.06 2	C 22 0.06 2	C 22	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2036 Total PH2	LOS Delay V/C Q	B 14 0.02 0	B 14 0.02 0	B 14 0.02 0	B 14	D 28 0.08 2	D 28 0.08 2	D 28 0.08 2	D 28	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2036 Total PH3	LOS Delay V/C Q	B 15 0.02 0	B 15 0.02 0	B 15 0.02 0	B 15	D 29 0.09 2	D 29 0.09 2	D 29 0.09 2	D 29	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2041 Background	LOS Delay V/C Q	B 13 0.02 0	B 13 0.02 0	B 13 0.02 0	B 13	D 26 0.08 2	D 26 0.08 2	D 26 0.08 2	D 26	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2041 Total PH3	LOS Delay V/C Q	B 15 0.02 1	B 15 0.02 1	B 15 0.02 1	B 15	E 35 0.11 3	E 35 0.11 3	E 35 0.11 3	E 35	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	B 13 0.02 0	B 13 0.02 0	B 13 0.02 0	B 13	D 28 0.09 2	D 28 0.09 2	D 28 0.09 2	D 28	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
PM Peak Hour	5 - Highway 140 at Concession 3 Road	TWSC	Existing	LOS Delay V/C Q	C 18 0.02 0	C 18 0.02 0	C 18 0.02 0	C 18	C 15 0.01 0	C 15 0.01 0	C 15 0.01 0	C 15	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Background	LOS Delay V/C Q	C 19 0.02 1	C 19 0.02 1	C 19 0.02 1	C 19	C 16 0.01 0	C 16 0.01 0	C 16 0.01 0	C 16	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2026 Total	LOS Delay V/C Q	C 22 0.02 1	C 22 0.02 1	C 22 0.02 1	C 22	C 18 0.02 0	C 18 0.02 0	C 18 0.02 0	C 18	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.00 0	A 0 0.00 0	A 0 0.00 0	A 0
			2031 Background	LOS Delay V/C Q	C 21 0.02 1	C 21 0.02 1	C 21 0.02 1	C 21	C 18 0.02 0	C 18 0.02 0	C 18 0.02 0	C 18	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2031 Total	LOS Delay V/C Q	D 27 0.03 1	D 27 0.03 1	D 27 0.03 1	D 27	C 22 0.02 1	C 22 0.02 1	C 22 0.02 1	C 22	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2036 Background	LOS Delay V/C Q	C 25 0.03 1	C 25 0.03 1	C 25 0.03 1	C 25	C 20 0.03 1	C 20 0.03 1	C 20 0.03 1	C 20	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2036 Total PH2	LOS Delay V/C Q	D 33 0.04 1	D 33 0.04 1	D 33 0.04 1	D 33	D 26 0.04 1	D 26 0.04 1	D 26 0.04 1	D 26	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2036 Total PH3	LOS Delay V/C Q	D 34 0.05 1	D 34 0.05 1	D 34 0.05 1	D 34	D 27 0.04 1	D 27 0.04 1	D 27 0.04 1	D 27	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2041 Background	LOS Delay V/C Q	D 29 0.04 1	D 29 0.04 1	D 29 0.04 1	D 29	C 23 0.03 1	C 23 0.03 1	C 23 0.03 1	C 23	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2041 Total PH3	LOS Delay V/C Q	E 41 0.06 1	E 41 0.06 1	E 41 0.06 1	E 41	D 31 0.05 1	D 31 0.05 1	D 31 0.05 1	D 31	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	D 31 0.04 1	D 31 0.04 1	D 31 0.04 1	D 31	C 24 0.04 1	C 24 0.04 1	C 24 0.04 1	C 24	A 0 0.00 0	A 0 0.00 0	A 0 0.01 0	A 0	A 0 0.01 0	A 0 0.01 0	A 0 0.00 0	A 0

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex - Existing Available Storage

Avail - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout



5.2.6 Highway 140 at Concession 2 Road

2024 Base Year Operations	Within Capacity	●
2026 Background Operations	Within Capacity	●
2026 Total Operations	Within Capacity	●
2031 Background Operations	Within Capacity	●
2031 Total Operations PH1	Within Capacity	●
2036 Background Operations	Within Capacity	●
2036 Total Operations PH2	Within Capacity	●
2036 Total Operations PH3	Within Capacity	●
2041 Background Operations	Within Capacity	●
2041 Total Operations PH3	Within Capacity	●
2041 Total Operations PH3 (Alternative)	Within Capacity	●

Individual movements at the signalized intersection of Highway 140 and Concession 2 Road presently operate at LOS C or better during the weekday peak hours.

Similar operations are projected under the 2026, 2036, and 2041 Background Horizons.

Regarding development traffic implications, similar levels of operation are expected under the 2026, 2036 and 2041 Total conditions with site-generated traffic volumes.

With respect to the alternative distribution assumptions, the operations have not changed.

Critical Movements (v/c over 0.85)

- ▶ None



TABLE 5.6: INTERSECTION OPERATIONS– (6 OF 7)

Analysis Period	Intersection	Control Type	Horizon	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	6 - Highway 140 at Concession 2 Road	TCS	Existing	LOS Delay V/C Q	C 29 0.18 9	C 29 0.18 9	C 29 0.18 9	C 29	C 30 0.32 14	C 30 0.32 14	C 30 0.32 14	C 30	A 2 0.00 1	A 4 0.38 38	A 2 0.02 1	A 3	A 2 0.07 3	A 3 0.24 22	A 2 0.02 1	A 3	A 5 0.37
			2026 Background	LOS Delay V/C Q	C 29 0.18 9	C 29 0.18 9	C 29 0.18 9	C 29	C 30 0.32 14	C 30 0.32 14	C 30 0.32 14	C 30	A 2 0.00 1	A 4 0.39 40	A 2 0.02 1	A 4	A 2 0.07 4	A 3 0.25 23	A 2 0.02 1	A 3	A 6 0.38
			2026 Total	LOS Delay V/C Q	C 29 0.18 9	C 29 0.18 9	C 29 0.18 9	C 29	C 30 0.32 14	C 30 0.32 14	C 30 0.32 14	C 30	A 2 0.00 1	A 4 0.45 50	A 2 0.02 1	A 4	A 2 0.08 4	A 3 0.26 26	A 2 0.02 1	A 3	A 6 0.43
			2031 Background	LOS Delay V/C Q	C 28 0.20 9	C 28 0.20 9	C 28 0.20 9	C 28	C 30 0.36 16	C 30 0.36 16	C 30 0.36 16	C 30	A 2 0.00 1	A 4 0.43 48	A 2 0.02 2	A 4	A 3 0.09 27	A 2 0.28 27	A 2 0.02 1	A 3	A 6 0.42
			2031 Total	LOS Delay V/C Q	C 28 0.20 9	C 28 0.20 9	C 28 0.20 9	C 28	C 30 0.36 16	C 30 0.36 16	C 30 0.36 16	C 30	A 2 0.00 1	A 5 0.53 68	A 2 0.02 2	A 5	A 3 0.11 4	A 3 0.32 32	A 2 0.02 1	A 3	A 6 0.51
			2036 Background	LOS Delay V/C Q	C 26 0.18 10	C 26 0.18 10	C 26 0.18 10	C 26	C 28 0.32 17	C 28 0.32 17	C 28 0.32 17	C 28	A 3 0.01 1	A 5 0.50 58	A 3 0.03 2	A 5	A 3 0.11 5	A 4 0.32 31	A 2 0.02 2	A 4	A 7 0.47
			2036 Total PH2	LOS Delay V/C Q	C 26 0.18 10	C 26 0.18 10	C 26 0.18 10	C 26	C 28 0.32 17	C 28 0.32 17	C 28 0.32 17	C 28	A 3 0.01 1	A 7 0.60 82	A 3 0.03 2	A 6	A 4 0.14 5	A 4 0.36 36	A 2 0.02 2	A 4	A 7 0.55
			2036 Total PH3	LOS Delay V/C Q	C 26 0.18 10	C 26 0.18 10	C 26 0.18 10	C 26	C 28 0.32 17	C 28 0.32 17	C 28 0.32 17	C 28	A 3 0.01 1	A 7 0.62 88	A 3 0.03 2	A 7	A 4 0.14 5	A 4 0.37 38	A 2 0.02 2	A 4	A 7 0.57
			2041 Background	LOS Delay V/C Q	C 26 0.19 11	C 26 0.19 11	C 26 0.19 11	C 26	C 28 0.34 18	C 28 0.34 18	C 28 0.34 18	C 28	A 3 0.01 1	A 6 0.55 71	A 3 0.03 2	A 6	A 4 0.14 5	A 4 0.36 37	A 2 0.03 2	A 4	A 7 0.52
			2041 Total PH3	LOS Delay V/C Q	C 26 0.19 11	C 26 0.19 11	C 26 0.19 11	C 26	C 28 0.34 18	C 28 0.34 18	C 28 0.34 18	C 28	A 3 0.01 1	A 8 0.68 108	A 3 0.03 2	A 8	A 5 0.18 6	A 4 0.44 44	A 2 0.03 2	A 5	A 8 0.62
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	C 26 0.19 11	C 26 0.19 11	C 26 0.19 11	C 26	C 28 0.34 18	C 28 0.34 18	C 28 0.34 18	C 28	A 3 0.01 1	A 6 0.58 77	A 3 0.03 2	A 6	A 4 0.14 6	A 4 0.37 38	A 2 0.03 2	A 4	A 7 0.54
PM Peak Hour	6 - Highway 140 at Concession 2 Road	TCS	Existing	LOS Delay V/C Q	C 26 0.16 11	C 26 0.16 11	C 26 0.16 11	C 26	C 28 0.35 19	C 28 0.35 19	C 28 0.35 19	C 28	A 0 0.00 0	A 4 0.35 35	A 3 0.03 3	A 4	A 3 0.04 3	A 4 0.33 33	A 2 0.02 1	A 4	A 6 0.35
			2026 Background	LOS Delay V/C Q	C 26 0.16 11	C 26 0.16 11	C 26 0.16 11	C 26	C 28 0.36 20	C 28 0.36 20	C 28 0.36 20	C 28	A 0 0.00 0	A 4 0.36 37	A 3 0.03 3	A 4	A 3 0.04 3	A 4 0.35 36	A 2 0.02 2	A 4	A 7 0.36
			2026 Total	LOS Delay V/C Q	C 26 0.16 11	C 26 0.16 11	C 26 0.16 11	C 26	C 28 0.36 20	C 28 0.36 20	C 28 0.36 20	C 28	A 0 0.00 0	A 5 0.40 42	A 3 0.03 3	A 4	A 3 0.04 3	A 5 0.42 47	A 2 0.02 2	A 5	A 7 0.41
			2031 Background	LOS Delay V/C Q	C 26 0.18 12	C 26 0.18 12	C 26 0.18 12	C 26	C 28 0.40 22	C 28 0.40 22	C 28 0.40 22	C 28	A 0 0.00 0	A 5 0.40 44	A 3 0.04 3	A 4	A 3 0.05 3	A 4 0.38 42	A 2 0.02 2	A 4	A 7 0.40
			2031 Total	LOS Delay V/C Q	C 26 0.18 12	C 26 0.18 12	C 26 0.18 12	C 26	C 28 0.40 22	C 28 0.40 22	C 28 0.40 22	C 28	A 0 0.00 0	A 5 0.45 53	A 3 0.04 3	A 5	A 3 0.05 3	A 5 0.50 62	A 2 0.02 2	A 5	A 7 0.48
			2036 Background	LOS Delay V/C Q	C 26 0.20 12	C 26 0.20 12	C 26 0.20 12	C 26	C 28 0.44 24	C 28 0.44 24	C 28 0.44 24	C 28	A 0 0.00 0	A 5 0.44 53	A 3 0.04 3	A 5	A 3 0.06 4	A 4 0.43 51	A 2 0.02 2	A 5	A 7 0.44
			2036 Total PH2	LOS Delay V/C Q	C 26 0.20 12	C 26 0.20 12	C 26 0.20 12	C 26	C 28 0.44 24	C 28 0.44 24	C 28 0.44 24	C 28	A 0 0.00 0	A 6 0.50 64	A 3 0.04 3	A 5	A 3 0.06 4	A 6 0.54 75	A 2 0.02 2	A 6	A 8 0.53
			2036 Total PH3	LOS Delay V/C Q	C 26 0.20 12	C 26 0.20 12	C 26 0.20 12	C 26	C 28 0.44 24	C 28 0.44 24	C 28 0.44 24	C 28	A 0 0.00 0	A 6 0.50 65	A 3 0.04 3	A 5	A 3 0.06 4	A 6 0.56 79	A 2 0.02 2	A 6	A 8 0.54
			2041 Background	LOS Delay V/C Q	C 26 0.21 13	C 26 0.21 13	C 26 0.21 13	C 26	C 29 0.48 26	C 29 0.48 26	C 29 0.48 26	C 29	A 0 0.00 0	A 6 0.49 65	A 3 0.05 4	A 5	A 3 0.07 4	A 5 0.47 62	A 2 0.02 3	A 5	A 8 0.49
			2041 Total PH3	LOS Delay V/C Q	C 26 0.21 13	C 26 0.21 13	C 26 0.21 13	C 26	C 29 0.48 26	C 29 0.48 26	C 29 0.48 26	C 29	A 0 0.00 0	A 6 0.55 80	A 3 0.05 4	A 6	A 3 0.08 4	A 7 0.61 96	A 2 0.02 3	A 7	A 8 0.59
			2041 Total PH3 (Alternative)	LOS Delay V/C Q	C 26 0.21 13	C 26 0.21 13	C 26 0.21 13	C 26	C 29 0.48 26	C 29 0.48 26	C 29 0.48 26	C 29	A 0 0.00 0	A 6 0.50 67	A 3 0.05 4	A 5	A 3 0.07 4	A 6 0.50 67	A 2 0.02 3	A 5	A 8 0.50

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length
Ex - Existing Available Storage
Avail - Available Storage

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout



5.2.7 Highway 140 at Access Road

2026 Total Operations	Increased Delays	●
2031 Total Operations PH1	Significant Delays	●
2036 Total Operations PH2	Significant Delays	●
2036 Total Operations PH3	Significant Delays	●
2041 Total Operations PH3	Significant Delays	●
2041 Total Operations PH3 (Alternative)	Significant Delays	●

At the unsignalized intersection of Highway 140 and Access Road, under the 2026 Total Horizon (weekday PM peak hour), the stop-controlled eastbound approach is projected to operate at LOS D with a v/c ratio no greater than 0.51.

Increased delay is projected for the stop-controlled approach during the 2031 and 2036 (PH2) Total Horizon, with the movement degrading from LOS D to LOS F with a v/c ratio less than 1.00 during the weekday peak hours.

With the additional traffic from Phase 3 (2036 PH3 and 2041 PH3), the stop-controlled approach is projected to continue operating at LOS F, with a v/c ratio exceeding 1.00 during the weekday PM peak hour.

With respect to the alternative distribution assumptions, an increase in delay is forecast for the overcapacity movements (eastbound approach). However, the analysis remains fundamentally unchanged.

Critical Movements (LOS E/F)

- Eastbound Approach (2031 Total)



TABLE 5.7: INTERSECTION OPERATIONS– (7 OF 7)

Analysis Period	Intersection	Control Type	Horizon	MOE	Direction / Movement / Approach															
					Eastbound				Westbound				Northbound				Southbound			
					Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach
AM Peak Hour	7 - Highway 140 at Access Road	TWSC	2026 Total	LOS Delay V/C Q	C 20 0.19 6		C 20 0.19 6	C 20					A 2 0.07 2	A 2 0.07 2		A 2		A 0 0.25 0	A 0 0.25 0	A 0
			2031 Total	LOS Delay V/C Q	D 32 0.42 16		D 32 0.42 16	D 32					A 3 0.13 4	A 3 0.13 4		A 3		A 0 0.29 0	A 0 0.29 0	A 0
			2036 Total PH2	LOS Delay V/C Q	E 39 0.48 19		E 39 0.48 19	E 39					A 3 0.13 4	A 3 0.13 4		A 3		A 0 0.31 0	A 0 0.31 0	A 0
			2036 Total PH3	LOS Delay V/C Q	F 54 0.63 29		F 54 0.63 29	F 54					A 4 0.16 5	A 4 0.16 5		A 4		A 0 0.33 0	A 0 0.33 0	A 0
			2041 Total PH3	LOS Delay V/C Q	F 75 0.74 36		F 75 0.74 36	F 75					A 4 0.17 5	A 4 0.17 5		A 4		A 0 0.35 0	A 0 0.35 0	A 0
			2041 Total PH3	LOS Delay V/C Q	F 84 0.78 38		F 84 0.78 38	F 84					A 1 0.03 1	A 1 0.03 1		A 1	A 0 0.43 0	A 0 0.43 0		A 0
PM Peak Hour	7 - Highway 140 at Access Road	TWSC	2026 Total	LOS Delay V/C Q	D 29 0.51 22		D 29 0.51 22	D 29					A 1 0.05 1	A 1 0.05 1		A 1		A 0 0.35 0	A 0 0.35 0	A 0
			2031 Total	LOS Delay V/C Q	F 91 0.97 72		F 91 0.97 72	F 91					A 2 0.08 2	A 2 0.08 2		A 2		A 0 0.40 0	A 0 0.40 0	A 0
			2036 Total PH2	LOS Delay V/C Q	F 143 1.12 90		F 143 1.12 90	F 143					A 2 0.09 2	A 2 0.09 2		A 2		A 0 0.44 0	A 0 0.44 0	A 0
			2036 Total PH3	LOS Delay V/C Q	F 225 1.34 124		F 225 1.34 124	F 225					A 3 0.10 3	A 3 0.10 3		A 3		A 0 0.44 0	A 0 0.44 0	A 0
			2041 Total PH3	LOS Delay V/C Q	F 332 1.58 147		F 332 1.58 147	F 332					A 3 0.11 3	A 3 0.11 3		A 3		A 0 0.48 0	A 0 0.48 0	A 0
			2041 Total PH3	LOS Delay V/C Q	F 558 2.06 180		F 558 2.06 180	F 558					A 1 0.02 1	A 1 0.02 1		A 1	A 0 0.52 0	A 0 0.52 0		A 0

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout



6 Mitigation

The following section discusses the potential remedial measures that could be considered to better accommodate the forecast traffic volumes in the study area.

6.1 Assessment of Impacts

Based on the analyses, congestion is currently and/or forecast to occur at a few study area intersections. A summary of the findings at each intersection is further discussed.

6.1.1 Highway 140 at Regional Road 27

Based on the analysis of the intersection at Highway 140 and Regional Road 27, it was found that the northbound left-turn, westbound left-turn, and eastbound through movements will gradually degrade over time. By 2026 (Background Horizon), the westbound left-turn lane is forecast to experience increased delays, with a v/c ratio degrading to 0.86 during the weekday PM peak hour. By 2031 (Background Horizon), the westbound left-turn movement is expected to further degrade to LOS E, with a v/c ratio exceeding 0.90 during the weekday AM peak hour, and to LOS F during the weekday PM peak hour with a v/c ratio greater than 1.00. Under the 2036 Background Horizon, the eastbound through lane is anticipated to experience increased delays with a v/c ratio of 0.87 during the AM peak hour, eventually degrading to LOS E with a v/c ratio greater than 0.95 in the future horizons. The situation is projected to continue worsening for both the westbound and northbound left-turn movements, with operations likely reaching LOS E and ultimately LOS F, as v/c ratios surpass 1.00 during peak hours by 2041 (Background Horizon).

Similar levels of operation are expected between future Background and Total traffic conditions, with an additional increase in delay for the northbound left-turn, westbound left-turn, and eastbound through movements.

A possible improvement option for the intersection of Highway 140 and Regional Road 27 is to convert it into a roundabout. Generally speaking, the intersection capacity at a roundabout is approximately 1,300 vehicles entering and conflicting flows for a single-lane roundabout, 1,301 to 2,300 for a two-lane roundabout, and over 2,301 for a three-lane roundabout.



Based on the projections noted for the 2041 horizon, the vehicles entering and conflicting flows are projected to be between 1,300 and 2,300 during the weekday peak periods. This would indicate that a two-lane roundabout would be required to provide acceptable operations.

The size of a multilane roundabout is influenced by the number of lanes, strategy for serving trucks (straddling lanes versus staying in-lane), and site context. Size is also a byproduct of achieving target performance metrics. This often occurs by balancing the need to achieve speed control, providing adequate space for trucks and intended lane discipline, and promoting good vehicle path alignments.

The inscribed circle diameter (ICD) for a two-lane roundabout at this location would likely need to be at least 60 metres to account for a range of design vehicles expected to pass through the roundabout (agricultural equipment, busses, and trucks)¹⁶. A similar design has been implemented at Bloomington Road and Highway 48 intersection in the Town of Whitchurch-Stouffville.

Figure 6.1 illustrates a functional roundabout design at the intersection of Highway 140 and Regional Road 27. The design indicates that the roundabout can be accommodated within the existing right-of-way and would be considered a feasible option.

¹⁶ Ontario Trucking Association, Accommodating Commercial Vehicles in Roundabouts (Table 3), HDR iTrans, 2010





6.1.2 Highway 140 at Access Road

At the intersection of Highway 140 and Access Road, the stop-controlled approach is expected to operate with high levels of delay and operate at LOS F with a v/c ratio less than 1.00 during the 2031 and 2036 (PH2) Total Horizon. With additional traffic from Phase 3 (2036 PH3 and 2041 PH3), the stop-controlled approach is projected to continue operating at LOS F but with a v/c ratio exceeding 1.00 during the weekday PM peak hour.

A signal warrant analysis was conducted to determine if the projected traffic conditions would warrant improvements to the existing form of traffic control. The results of the analysis indicate traffic control signals are not warranted under the 2041 Total Horizon. **Appendix F** contains the signal warrant analysis.

Even though the signal criteria have not been met, installing unwarranted traffic control signals or a single-lane roundabout would improve operations.

6.2 Auxiliary Turn Lanes

6.2.1 Declaration Right Turn Lane

The proposed Public Access Road to Highway 140 was assessed to determine if the forecasted traffic volumes warrant installing a southbound right-turn lane along Highway 140.

Although right-turns are generally made more efficiently than left-turn movements, exclusive right-turn lanes are often provided for many of the same reasons that left-turn lanes are provided, such as reducing rear-end collisions and less delay for the through traffic.

MTO guidelines (Geometric Design Standards for Ontario Highways)¹⁷ note that right-turn lanes or tapers may be considered where right-turn volumes exceed 60 vehicles per hour (vph) and where right-turning vehicles create a hazard or reduce capacity at the intersection. The forecast right-turn movement at the new Public Access Road is approximately 69 vph during the AM peak hour and 37 vph during the PM peak hour.

With Highway 140 having the potential for higher vehicle speeds and forecast heavy truck turns into the site, particularly when future

¹⁷ Geometric Design Standards for Ontario Highways, Ministry of Transportation, Surveys & Design Office, Chapter E7.2



development comes online, it is recommended that a southbound right-turn lane be constructed to allow right-turn traffic to safely slow down before making the turn without interfering with through traffic.

Per the MTO guidelines¹⁸, a design speed of 100 km/h requires a total deceleration lane of 165 metres, including an 80-metre taper and an 85-metre parallel lane.

6.2.2 Acceleration Right Turn Lane

Concerning an acceleration lane, the driver of a stopped vehicle must be able to see a sufficient distance along the main roadway to cross over it safely before an approaching vehicle reaches the intersection, even if a vehicle comes into view just as the stopped vehicle departs. The length of the main roadway open to view must be greater than the product of its design speed and the time necessary for the stopped vehicle to start and cross the road.

In theory, intersections should ideally be designed so that right turns from the minor road can be made without causing any conflict with traffic, assuming traffic is advancing along the main roadway at the design speed. This would require sufficient sight distance so vehicles making right turns from a minor road can accelerate up to design speed before being overtaken by a vehicle advancing from the left.

Based on the sight distance review completed in **sub-section 3.1.2**, the sight distance within the road allowance to the north and south was measured as 300+ metres, which exceeds the minimum sight distance for a roadway with a 100 km/h design speed. Based on this, an acceleration lane would not be required from a sight distance perspective.

However, as the site is expected to generate a large volume of heavy vehicles (trucks) that require additional time to accelerate to the operating speed of the road, it is recommended that an acceleration be provided. The acceleration lane would provide that added benefit for a vehicle to accelerate up to speed before being overtaken by a vehicle advancing from the left, reducing the potential for a collision.

The Geometric Design Manual for Ontario Highways suggests that the outbound acceleration lane should have a total length of 305 meters (80 meters for the taper and 225 meters parallel length) for entering a highway from an intersection. It is recommended that these measures

¹⁸ Geometric Design Standards for Ontario Highways, Ministry of Transportation, Surveys & Design Office, Table E7-1



be implemented to minimize the potential safety impacts related to traffic operations.

6.2.3 Left-Turn Lanes

The storage requirements for a left-turn lane for the proposed signalized intersections of Highway 140 at the Proposed Public Access Road are based on the methodology defined in the MTO Geometric Design Standards for Ontario Highways. The vehicle arrival rates and green plus amber times for rural intersections were used, as noted in Table B7-4 of the manual. **Table 6.1** summarizes the results of the left-turn lane warrant analyses.

The following is noted for the intersection of Highway 140 and Public Access Road:

- ▶ A northbound left turn lane with 53 metres of storage is required under the 2041 Total horizon.

TABLE 6.1: LEFT-TURN LANE ANALYSIS (SIGNALIZED)

Highway 140 at Site Access				
Approach Direction			Northbound	
Peak Hour			AM	PM
Current Left Turn Storage (m)			-	-
Proposed Cycle Length (sec)			90	90
2041 Total Horizon			135	70
<i>Vehicles per cycle</i>			3.4	1.8
<i>Number of Vehicles (From Table B7-4)</i>			7	4
Projected Storage			53	30

Based on MTO Geometric Design Standards For Ontario Highways - 1985



6.3 Sensitivity Analysis

A sensitivity analysis to assess the identified improvements noted above at the study area intersections has been undertaken for the 2041 Total traffic conditions. The following improvements are assumed:

- ▶ Highway 140 at Regional Road 27
 - Replace existing signalized intersection with a two-lane roundabout.
- ▶ Highway 140 at Access Road
 - Traffic control signals with actuated uncoordinated control
 - Deceleration right turn lane (85-metre storage lane)
 - Acceleration right turn lane (225-metre storage lane)
 - Northbound left turn lane (55-metre storage lane)

Table 6.2 summarizes the results of the sensitivity analysis. **Appendix G** contains the detailed Synchro and ARCADY reports.

Overall, the intersections within the study area are expected to operate with considerable improvements. Constructing a roundabout at the intersection of Highway 140 at Regional Road 27 is projected to improve all approaches to LOS C or better during the weekday peak hours. The installation of traffic control signals at Highway 140 and the Access Road is projected to improve all approaches to LOS C or better during the weekday peak hours.



TABLE 6.2: SENSITIVITY ANALYSIS

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	1 - Highway 140 at Regional Road 27	RBT	LOS Delay V/C Q	< < < <	A 8 0.76 5	> > > >	A 8 8 A	< < < <	A 6 0.58 1	> > > >	A 6 A	< < < <	A 8 8 0.69 3	> > > >	A 8 A	< < < <	A 5 0.03 1	> > > >	A 5 A	A 7
	7 - Highway 140 & Access Rd	TCS	LOS Delay V/C Q	C 26 0.42 25	> > > >	C 26 C	> > > >	> > > >	> > > >	A 6 0.36 22	B 10 0.72 114	> > > >	A 10 A	> > > >	A 6 0.50 60	A 4 0.10 6	> > > >	A 6 A	A 9 0.67	
	7 - Highway 140 & Access Rd (Alternative)	TCS	LOS Delay V/C Q	C 29 0.58 34	> > > >	C 29 C	> > > >	> > > >	> > > >	A 5 0.07 5	B 11 0.73 123	> > > >	A 11 A	> > > >	A 7 0.5 65	A 5 0.2 8	> > > >	A 7 A	A 10 0.7	
PM Peak Hour	1 - Highway 140 at Regional Road 27	RBT	LOS Delay V/C Q	< < < <	C 18 0.90 30	> > > >	C 18 C	< < < <	B 15 0.84 17	> > > >	B 15 B	< < < <	A 9 0.73 4	> > > >	A 9 A	< < < <	A 6 0.04 1	> > > >	A 6 A	B 15
	Highway 140 & Access Rd	TCS	LOS Delay V/C Q	C 29 0.68 59	> > > >	C 29 C	> > > >	> > > >	> > > >	B 12 0.48 24	B 14 0.67 109	> > > >	B 13 B	> > > >	C 20 0.84 165	A 8 0.05 6	> > > >	B 19 A	B 18 0.79	
	7 - Highway 140 & Access Rd (Alternative)	TCS	LOS Delay V/C Q	C 32 0.75 81	> > > >	C 32 C	> > > >	> > > >	> > > >	B 9 0.09 4	B 15 0.69 109	> > > >	B 15 B	> > > >	C 23 0.86 165	A 9 0.11 8	> > > >	B 21 A	B 21 0.82	

MOE - Measure of Effectiveness

LOS - Level of Service

Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length

Ex - Existing Available Storage

Avail. - Available Storage

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

AWSC - All-Way Stop Control

RBT - Roundabout



7 Development Impacts

The Ministry of Ontario released a guideline called "A Guideline for Highway Improvements Associated with Development" to clarify who is responsible for roadway improvements when land use development requires it. This guide outlines the steps municipalities and stakeholders must follow when constructing improvements to a roadway, whether directly or indirectly.

7.1 Primary Impacts

Section 3A of the guideline outlines the following:

"Where a proposed Development will gain access to a provincial highway either directly by private entrance or by a new municipal road, the Proponent is responsible (financially or otherwise) for all warranted Highway Improvements, identified in the approved Traffic Impact Study. The Proponent is also responsible for any Highway Improvements that are not required immediately but that have been identified as being warranted in the future as a result of the Development. Any such future Highway Improvements are the responsibility (financially or otherwise) of the Proponent and must be addressed to MTO's satisfaction before MTO permits will be issued."

Section 3C of the guideline outlines the following:

"Based upon MTO's review of a Proponent's Traffic Impact Study, it identifies a warrant for Highway Improvements based on existing and/or projected background traffic volumes. The Proponent would be responsible (financially or otherwise) for any additional Highway Improvements required over and above the existing and/or projected background traffic volumes, in order to accommodate the proposed Development traffic."

Based on the above, the Applicant will be responsible for the costs related to the new roadway connection to Highway 140 (Access Road), which includes a northbound left turn lane (Opening Day), deceleration lane (Opening Day), acceleration lane (Opening Day) and potentially unwarranted traffic control signals for Phase 2. Moreover, as improvements to the intersection of Highway 140 and Regional 27 have been identified under existing and the Background Horizon (without the development), these improvements would not be the Applicant's responsibility.



8 Conclusions and Recommendations

8.1 Conclusions

The proposal includes developing the parcel as an industrial development with the primary function being manufacturing (conversion of raw materials or parts into finished products). In addition to the actual production of goods, the development will have office space and provide space for warehouses, research, and associated functions.

The development will be constructed within three building pads, equating to a total gross floor area (GFA) of 185,806 square metres. The site will also provide a total of 1,525 parking spaces. The build-out of the development is proposed to occur over three phases. The site is estimated to generate 302 AM (272 vehicles/30 trucks) and 350 PM (330 vehicles/20 trucks) peak-hour trips.

The Applicant proposes constructing a spur line that would provide rail access to/from the proposed development. The intent of this spur line connection is for the transportation of raw materials by rail instead of trucks, which could see truck volumes to/from the site decrease by approximately 18%. However, as this is a long-term initiative, the spur line has not been assumed to be operational to reflect a conservative estimate concerning traffic projections.

Vehicular access is proposed by a full-move intersection to Highway 140, approximately 400 metres north of Kleinsmith Road. However, the Ministry of Transportation (MTO) will not permit a private driveway entrance to the development but is willing to permit a new public road access to Highway 140 provided there is no increase in the total number of intersections on the highway.

This would require the closure of one intersection to create a new public road. The intersection of Kleinsmith Road, which has more limited use than Forks Road, would be the most desirable intersection to close. As such, Kleinsmith Road would no longer have direct access to Highway 140, and the existing residents off Kleinsmith Road would access Highway 140 via the new Public Access Road.

This new Public Access Road would be constructed west/south from Highway 140 to Kleinsmith Road, where a municipal road or driveway connection would serve it. The roadway would be constructed west of this point as a private industrial roadway to Forks Road opposite Snider Road. This private industrial road would service all the land north of Forks Roads. However, for this study, all site-generated trips



are assigned to/from the Highway 140 access, as access to Forks Road will likely be limited to emergency access only.

At the approximate location of the proposed new Public Access Road, Highway 140 is relatively flat, with a slight horizontal curve on Highway 140 to the south of Kleinsmith Road. The sight distance within the road allowance to the north and south was measured as 300+ metres, which exceeds the minimum sight distance for a roadway with a design speed of 100 km/h.

Detailed traffic analysis was conducted for each of the study area intersections under Base (2024), 2026, 2031, 2036 and 2041 traffic conditions. The capacity analysis showed that deficiencies are projected to occur at certain locations within the study area with anticipated growth in traffic. The following capacity constraints at the study area intersections are identified.

Highway 140 at Regional Road 27

2024 Base Year Operations	Approaching Capacity	●
2026 Background Operations	Approaching Capacity	●
2026 Total Operations	Approaching Capacity	●
2031 Background Operations	Exceeding Capacity	●
2031 Total Operations PH1	Exceeding Capacity	●
2036 Background Operations	Exceeding Capacity	●
2036 Total Operations PH2	Exceeding Capacity	●
2036 Total Operations PH3	Exceeding Capacity	●
2041 Background Operations	Exceeding Capacity	●
2041 Total Operations PH3	Exceeding Capacity	●
2041 Total Operations PH3 (Alternative)	Exceeding Capacity	●
2041 Total Operations PH3 (Sensitivity)	Within Capacity	●

Based on the analysis of the intersection at Highway 140 and Regional Road 27, the northbound left turn lane currently operates in the LOS D range with a v/c ratio of 0.89 and is expected to degrade to LOS F with a v/c ratio greater than 1.00 overtime. Under the 2026 Background Horizon, the westbound left-turn lane is expected to experience increased delays, with a v/c ratio of 0.86 during the PM peak hour. By 2031, the westbound left-turn movement will further degrade to LOS E during the AM peak hour, with a v/c ratio exceeding 0.90, and to LOS F during the PM peak hour as the v/c ratio surpasses 1.00. By 2036, the eastbound through lane is anticipated to experience increased delays, eventually reaching LOS E with a v/c ratio greater than 0.95 in future horizons. By 2041, both the westbound and northbound left-turn movements are projected to deteriorate to LOS E and LOS F, with v/c ratios exceeding 1.00 during peak hours.



Similar levels of operation are expected between future Background and Total traffic conditions, with an additional increase in delay for the northbound left-turn movement. With respect to the alternative distribution assumptions, an increase in delay is proposed for the overcapacity movements (westbound and northbound left turn movements). However, the analysis remains fundamentally unchanged.

To accommodate traffic generated from general growth in the future, it is expected that modifications to the signal timings will be required:

- ▶ Replacing the signalized intersection at Highway 140 at Regional Road 27 to a two-lane roundabout.

Highway 140 at Access Road

2026 Total Operations	Increased Delays	●
2031 Total Operations PH1	Significant Delays	●
2036 Total Operations PH2	Significant Delays	●
2036 Total Operations PH3	Significant Delays	●
2041 Total Operations PH3	Significant Delays	●
2041 Total Operations PH3 (Alternative)	Significant Delays	●
2041 Total Operations PH3 (Sensitivity)	Within Capacity	●

At the unsignalized intersection of Highway 140 and Access Road, under the 2026 Total Horizon (weekday PM peak hour), the stop-controlled eastbound approach is projected to operate at LOS D with a v/c ratio no greater than 0.51.

Increased delay is projected for the stop-controlled approach during the 2031 and 2036 (PH2) Total Horizon, with the movement degrading to LOS F with a v/c ratio greater than 1.00 during the weekday PM peak hour.

With the additional traffic from Phase 3 (2036 PH3 and 2041 PH3), the stop-controlled approach is projected to continue operating at LOS F, with a v/c ratio exceeding 1.00 during the weekday PM peak hour.

To accommodate projected traffic volumes from the proposed development, adjustments to the roadway geometry are likely required and include the following:

- ▶ Deceleration right-turn lane (Opening Day).
- ▶ Acceleration right-turn lane (Opening Day).
- ▶ Northbound left-turn lane (Opening Day).
- ▶ Traffic control signals or a roundabout (Phase 2).



8.2 Recommendations

Based on the findings of this study, it is recommended that:

- ▶ The intersection of Highway 140 at Kleinsmith Road be closed with access for residents of Kleinsmith Road provided via the new Public Access Road.
- ▶ The Applicant be responsible for costs related to the new roadway connection to Highway 140 (Access Road), which includes a southbound left turn lane, deceleration and acceleration right turn lanes, and potentially unwarranted traffic control signals or a roundabout.
- ▶ The Ministry of Transportation and Niagara Region monitor the future traffic volumes at the intersection of Highway 140 and Regional Road 27/East Main Street and considers constructing a two-lane roundabout accordingly.



Appendix A

Existing Traffic Volumes





Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Highway 140 & 2nd Concession Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 1

Turning Movement Data

Start Time	2nd Concession Road Eastbound						2nd Concession Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	5	1	0	0	0	6	2	0	12	0	0	14	1	99	11	0	0	111	2	43	1	0	0	46	177
7:15 AM	6	0	2	0	0	8	5	1	9	0	0	15	0	99	5	0	0	104	3	45	0	0	0	48	175
7:30 AM	5	1	0	0	0	6	12	1	1	0	0	14	2	127	4	0	0	133	4	79	2	0	0	85	238
7:45 AM	0	2	0	0	0	2	3	1	4	0	0	8	1	101	11	0	0	113	8	61	2	0	0	71	194
Hourly Total	16	4	2	0	0	22	22	3	26	0	0	51	4	426	31	0	0	461	17	228	5	0	0	250	784
8:00 AM	5	2	0	0	0	7	5	1	3	0	0	9	0	115	6	0	0	121	9	74	7	0	0	90	227
8:15 AM	5	1	0	0	0	6	6	3	11	0	0	20	0	92	3	0	0	95	6	63	8	0	0	77	198
8:30 AM	7	0	0	0	0	7	8	0	3	0	0	11	0	74	3	0	0	77	3	63	3	0	0	69	164
8:45 AM	3	1	0	0	0	4	14	1	7	0	0	22	1	77	6	0	0	84	9	73	2	0	0	84	194
Hourly Total	20	4	0	0	0	24	33	5	24	0	0	62	1	358	18	0	0	377	27	273	20	0	0	320	783
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	4	1	1	0	0	6	6	2	5	0	0	13	0	60	9	0	0	69	7	49	5	0	0	61	149
11:15 AM	5	3	1	0	0	9	6	3	2	0	0	11	1	78	4	0	0	83	11	55	6	0	0	72	175
11:30 AM	7	2	0	0	0	9	8	4	10	0	0	22	0	74	6	0	0	80	3	62	3	0	0	68	179
11:45 AM	1	2	0	0	0	3	9	4	5	0	0	18	0	74	8	0	0	82	5	67	4	0	0	76	179
Hourly Total	17	8	2	0	0	27	29	13	22	0	0	64	1	286	27	0	0	314	26	233	18	0	0	277	682
12:00 PM	5	3	0	0	0	8	7	0	4	0	0	11	1	66	9	0	0	76	3	83	7	0	0	93	188
12:15 PM	5	1	1	0	0	7	7	3	3	0	0	13	0	84	8	0	0	92	3	66	6	0	0	75	187
12:30 PM	4	0	0	0	0	4	8	0	8	0	0	16	0	72	8	0	0	80	10	76	5	0	0	91	191
12:45 PM	2	1	0	0	0	3	4	0	7	0	0	11	0	53	17	0	0	70	6	65	2	0	0	73	157
Hourly Total	16	5	1	0	0	22	26	3	22	0	0	51	1	275	42	0	0	318	22	290	20	0	0	332	723
1:00 PM	3	1	0	0	0	4	6	1	7	0	0	14	0	67	7	0	0	74	5	58	11	0	0	74	166
1:15 PM	9	2	0	0	0	11	7	2	5	0	0	14	0	67	7	0	0	74	6	68	8	0	0	82	181
1:30 PM	5	0	0	0	0	5	9	0	7	0	0	16	0	72	7	0	0	79	5	74	5	0	0	84	184
1:45 PM	0	0	0	0	0	0	6	0	4	0	0	10	0	66	5	0	0	71	1	59	1	0	0	61	142
Hourly Total	17	3	0	0	0	20	28	3	23	0	0	54	0	272	26	0	0	298	17	259	25	0	0	301	673
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	3	1	0	0	0	4	5	3	5	0	0	13	0	90	7	0	0	97	3	90	7	0	0	100	214
3:15 PM	7	3	1	0	0	11	4	4	1	0	0	9	0	101	14	0	0	115	3	96	10	0	0	109	244
3:30 PM	8	1	0	0	0	9	13	1	4	0	0	18	0	94	11	0	0	105	6	123	5	0	0	134	266
3:45 PM	4	2	0	0	0	6	18	5	5	0	0	28	0	97	7	0	0	104	4	89	5	0	0	98	236
Hourly Total	22	7	1	0	0	30	40	13	15	0	0	68	0	382	39	0	0	421	16	398	27	0	0	441	960
4:00 PM	2	0	3	0	0	5	15	0	5	0	0	20	0	100	10	0	0	110	6	77	3	0	0	86	221
4:15 PM	3	1	0	0	0	4	7	0	4	0	0	11	0	78	7	0	0	85	1	123	2	0	0	126	226
4:30 PM	2	1	1	0	0	4	7	5	5	0	0	17	1	89	7	1	0	98	1	112	4	0	0	117	236

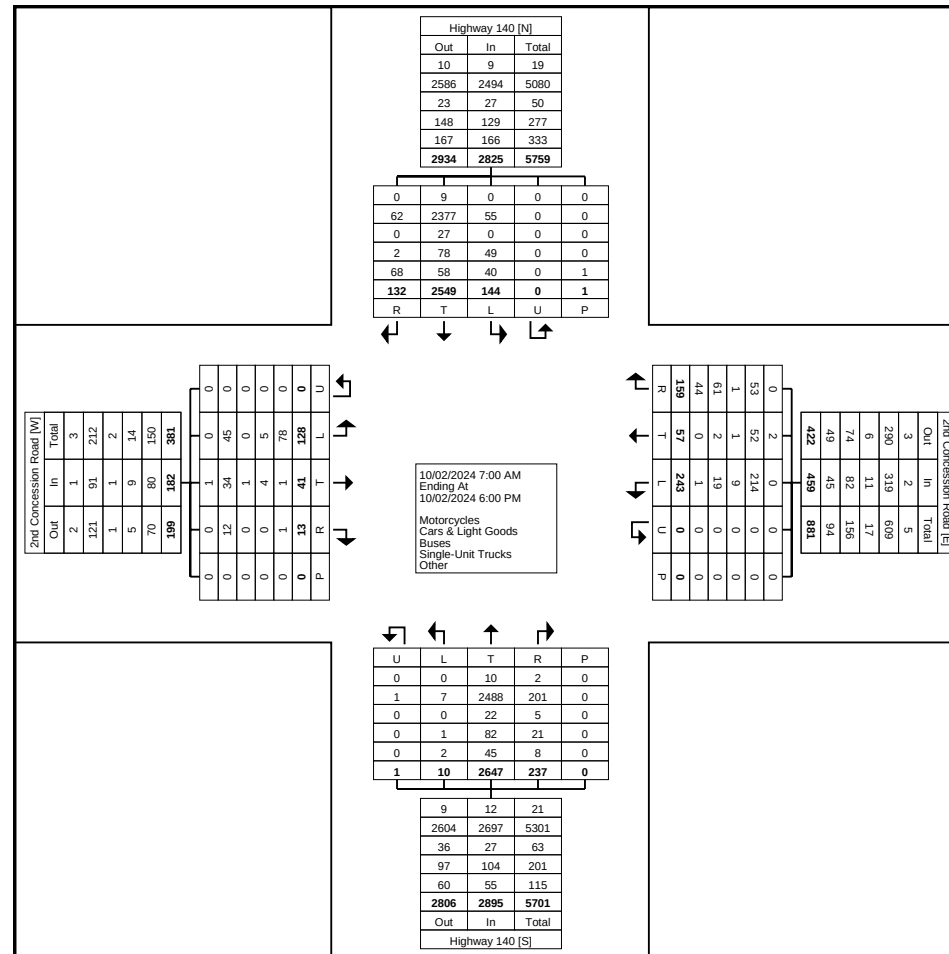
4:45 PM	3	2	0	0	0	5	8	2	1	0	0	11	0	77	5	0	0	82	2	128	3	0	0	133	231
Hourly Total	10	4	4	0	0	18	37	7	15	0	0	59	1	344	29	1	0	375	10	440	12	0	0	462	914
5:00 PM	5	0	2	0	0	7	10	2	5	0	0	17	0	90	9	0	0	99	2	106	3	0	0	111	234
5:15 PM	3	2	0	0	0	5	10	5	5	0	0	20	0	66	8	0	0	74	1	133	1	0	0	135	234
5:30 PM	1	2	1	0	0	4	5	1	0	0	0	6	0	88	2	0	0	90	5	104	1	0	1	110	210
5:45 PM	1	2	0	0	0	3	3	2	2	0	0	7	2	60	6	0	0	68	1	85	0	0	0	86	164
Hourly Total	10	6	3	0	0	19	28	10	12	0	0	50	2	304	25	0	0	331	9	428	5	0	1	442	842
Grand Total	128	41	13	0	0	182	243	57	159	0	0	459	10	2647	237	1	0	2895	144	2549	132	0	1	2825	6361
Approach %	70.3	22.5	7.1	0.0	-	-	52.9	12.4	34.6	0.0	-	-	0.3	91.4	8.2	0.0	-	-	5.1	90.2	4.7	0.0	-	-	-
Total %	2.0	0.6	0.2	0.0	-	2.9	3.8	0.9	2.5	0.0	-	7.2	0.2	41.6	3.7	0.0	-	45.5	2.3	40.1	2.1	0.0	-	44.4	-
Motorcycles	0	1	0	0	-	1	0	2	0	0	-	2	0	10	2	0	-	12	0	9	0	0	-	9	24
% Motorcycles	0.0	2.4	0.0	-	-	0.5	0.0	3.5	0.0	-	-	0.4	0.0	0.4	0.8	0.0	-	0.4	0.0	0.4	0.0	-	-	0.3	0.4
Cars & Light Goods	45	34	12	0	-	91	214	52	53	0	-	319	7	2488	201	1	-	2697	55	2377	62	0	-	2494	5601
% Cars & Light Goods	35.2	82.9	92.3	-	-	50.0	88.1	91.2	33.3	-	-	69.5	70.0	94.0	84.8	100.0	-	93.2	38.2	93.3	47.0	-	-	88.3	88.1
Buses	0	1	0	0	-	1	9	1	1	0	-	11	0	22	5	0	-	27	0	27	0	0	-	27	66
% Buses	0.0	2.4	0.0	-	-	0.5	3.7	1.8	0.6	-	-	2.4	0.0	0.8	2.1	0.0	-	0.9	0.0	1.1	0.0	-	-	1.0	1.0
Single-Unit Trucks	5	4	0	0	-	9	19	2	61	0	-	82	1	82	21	0	-	104	49	78	2	0	-	129	324
% Single-Unit Trucks	3.9	9.8	0.0	-	-	4.9	7.8	3.5	38.4	-	-	17.9	10.0	3.1	8.9	0.0	-	3.6	34.0	3.1	1.5	-	-	4.6	5.1
Articulated Trucks	78	1	1	0	-	80	0	0	44	0	-	44	2	45	2	0	-	49	40	58	68	0	-	166	339
% Articulated Trucks	60.9	2.4	7.7	-	-	44.0	0.0	0.0	27.7	-	-	9.6	20.0	1.7	0.8	0.0	-	1.7	27.8	2.3	51.5	-	-	5.9	5.3
Bicycles on Road	0	0	0	0	-	0	1	0	0	0	-	1	0	0	6	0	-	6	0	0	0	0	-	0	7
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.4	0.0	0.0	-	-	0.2	0.0	0.0	2.5	0.0	-	0.2	0.0	0.0	0.0	-	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-



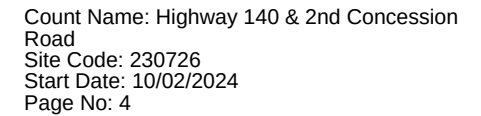
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Highway 140 & 2nd Concession
Road
Site Code: 230726
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Turning Movement Data Plot

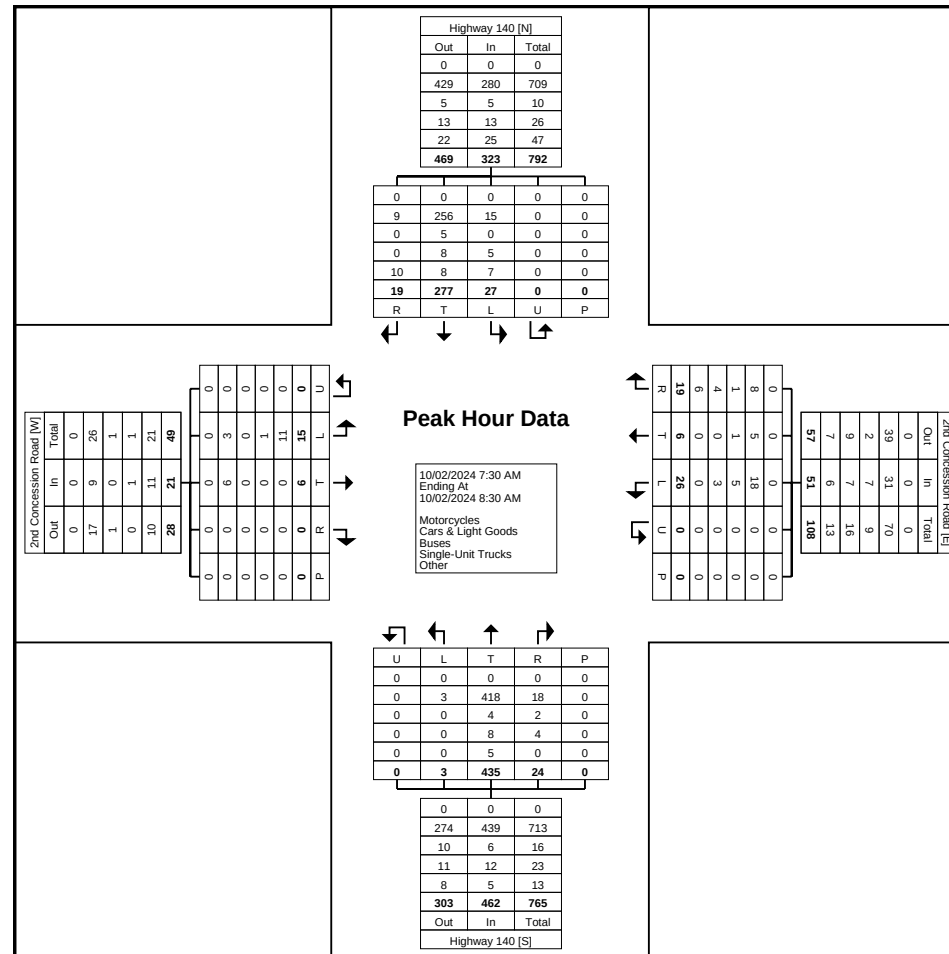
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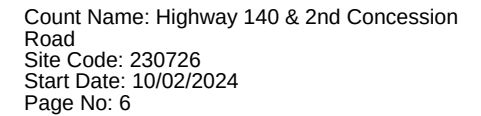
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Highway 140 & 2nd Concession
Road
Site Code: 230726
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Turning Movement Peak Hour Data Plot (7:30 AM)



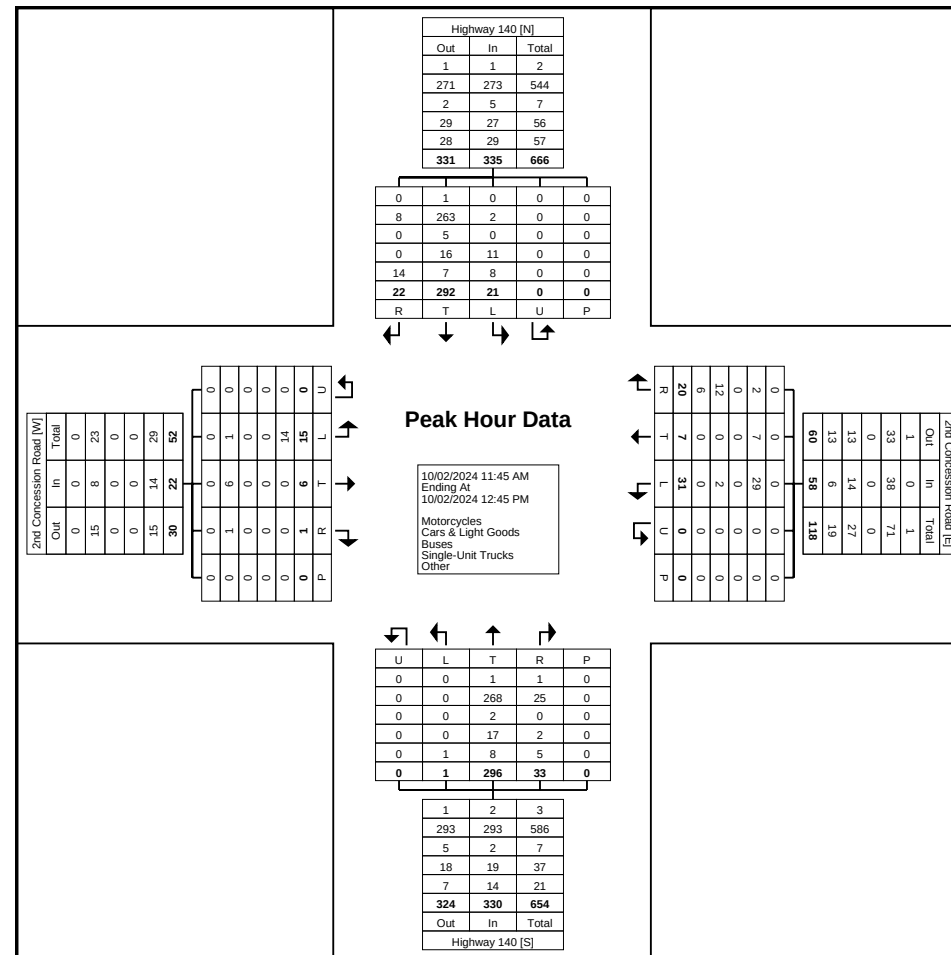
Start Time	2nd Concession Road Eastbound						2nd Concession Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	1	2	0	0	0	3	9	4	5	0	0	18	0	74	8	0	0	82	5	67	4	0	0	76	179
12:00 PM	5	3	0	0	0	8	7	0	4	0	0	11	1	66	9	0	0	76	3	83	7	0	0	93	188
12:15 PM	5	1	1	0	0	7	7	3	3	0	0	13	0	84	8	0	0	92	3	66	6	0	0	75	187
12:30 PM	4	0	0	0	0	4	8	0	8	0	0	16	0	72	8	0	0	80	10	76	5	0	0	91	191
Total	15	6	1	0	0	22	31	7	20	0	0	58	1	296	33	0	0	330	21	292	22	0	0	335	745
Approach %	68.2	27.3	4.5	0.0	-	-	53.4	12.1	34.5	0.0	-	-	0.3	89.7	10.0	0.0	-	-	6.3	87.2	6.6	0.0	-	-	-
Total %	2.0	0.8	0.1	0.0	-	3.0	4.2	0.9	2.7	0.0	-	7.8	0.1	39.7	4.4	0.0	-	44.3	2.8	39.2	3.0	0.0	-	45.0	-
PHF	0.750	0.500	0.250	0.000	-	0.688	0.861	0.438	0.625	0.000	-	0.806	0.250	0.881	0.917	0.000	-	0.897	0.525	0.880	0.786	0.000	-	0.901	0.975
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	1	0	-	2	0	1	0	0	-	1	3
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	3.0	-	-	0.6	0.0	0.3	0.0	-	-	0.3	0.4
Cars & Light Goods	1	6	1	0	-	8	29	7	2	0	-	38	0	268	25	0	-	293	2	263	8	0	-	273	612
% Cars & Light Goods	6.7	100.0	100.0	-	-	36.4	93.5	100.0	10.0	-	-	65.5	0.0	90.5	75.8	-	-	88.8	9.5	90.1	36.4	-	-	81.5	82.1
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	2	0	0	-	2	0	5	0	0	-	5	7
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.6	0.0	1.7	0.0	-	-	1.5	0.9
Single-Unit Trucks	0	0	0	0	-	0	2	0	12	0	-	14	0	17	2	0	-	19	11	16	0	0	-	27	60
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	6.5	0.0	60.0	-	-	24.1	0.0	5.7	6.1	-	-	5.8	52.4	5.5	0.0	-	-	8.1	8.1
Articulated Trucks	14	0	0	0	-	14	0	0	6	0	-	6	1	8	0	0	-	9	8	7	14	0	-	29	58
% Articulated Trucks	93.3	0.0	0.0	-	-	63.6	0.0	0.0	30.0	-	-	10.3	100.0	2.7	0.0	-	-	2.7	38.1	2.4	63.6	-	-	8.7	7.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	5	0	-	5	0	0	0	0	-	0	5
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	15.2	-	-	1.5	0.0	0.0	0.0	-	-	0.0	0.7
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

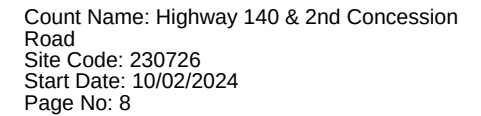


Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Highway 140 & 2nd Concession
Road
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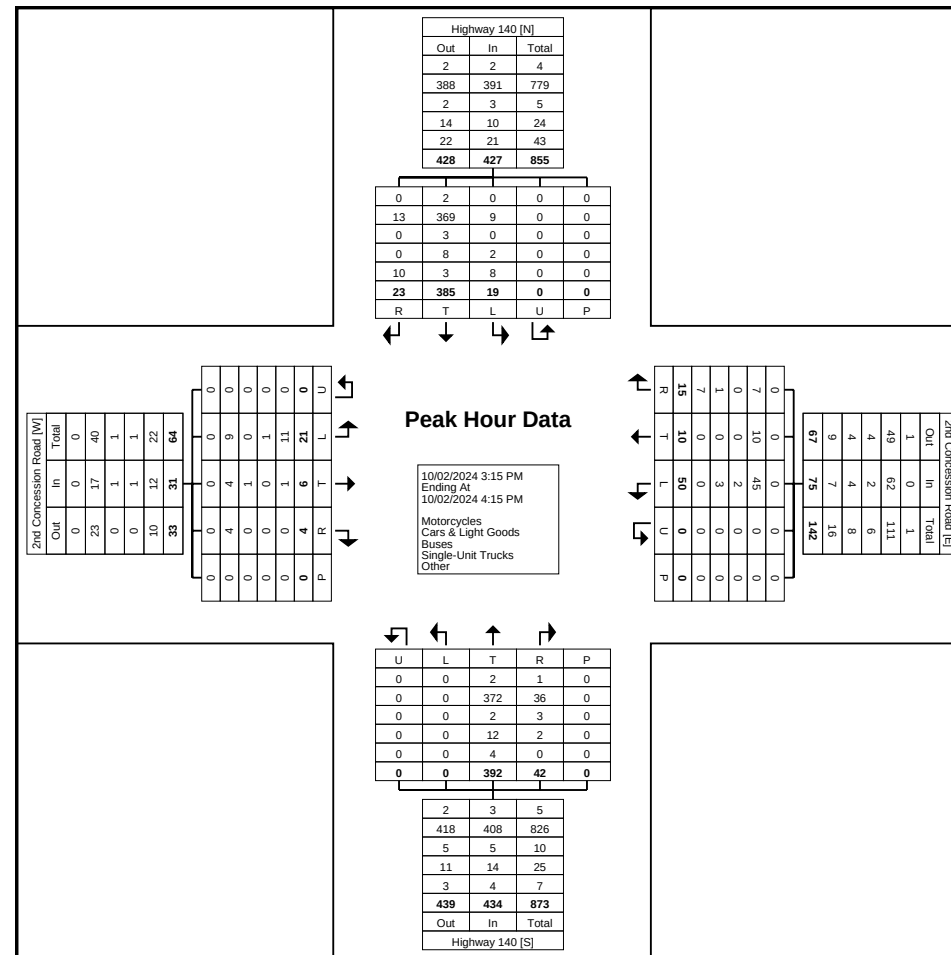
Start Time	2nd Concession Road Eastbound						2nd Concession Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:15 PM	7	3	1	0	0	11	4	4	1	0	0	9	0	101	14	0	0	115	3	96	10	0	0	109	244
3:30 PM	8	1	0	0	0	9	13	1	4	0	0	18	0	94	11	0	0	105	6	123	5	0	0	134	266
3:45 PM	4	2	0	0	0	6	18	5	5	0	0	28	0	97	7	0	0	104	4	89	5	0	0	98	236
4:00 PM	2	0	3	0	0	5	15	0	5	0	0	20	0	100	10	0	0	110	6	77	3	0	0	86	221
Total	21	6	4	0	0	31	50	10	15	0	0	75	0	392	42	0	0	434	19	385	23	0	0	427	967
Approach %	67.7	19.4	12.9	0.0	-	-	66.7	13.3	20.0	0.0	-	-	0.0	90.3	9.7	0.0	-	-	4.4	90.2	5.4	0.0	-	-	-
Total %	2.2	0.6	0.4	0.0	-	3.2	5.2	1.0	1.6	0.0	-	7.8	0.0	40.5	4.3	0.0	-	44.9	2.0	39.8	2.4	0.0	-	44.2	-
PHF	0.656	0.500	0.333	0.000	-	0.705	0.694	0.500	0.750	0.000	-	0.670	0.000	0.970	0.750	0.000	-	0.943	0.792	0.783	0.575	0.000	-	0.797	0.909
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	2	1	0	-	3	0	2	0	0	-	2	5
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.5	2.4	-	-	0.7	0.0	0.5	0.0	-	-	0.5	0.5
Cars & Light Goods	9	4	4	0	-	17	45	10	7	0	-	62	0	372	36	0	-	408	9	369	13	0	-	391	878
% Cars & Light Goods	42.9	66.7	100.0	-	-	54.8	90.0	100.0	46.7	-	-	82.7	-	94.9	85.7	-	-	94.0	47.4	95.8	56.5	-	-	91.6	90.8
Buses	0	1	0	0	-	1	2	0	0	0	-	2	0	2	3	0	-	5	0	3	0	0	-	3	11
% Buses	0.0	16.7	0.0	-	-	3.2	4.0	0.0	0.0	-	-	2.7	-	0.5	7.1	-	-	1.2	0.0	0.8	0.0	-	-	0.7	1.1
Single-Unit Trucks	1	0	0	0	-	1	3	0	1	0	-	4	0	12	2	0	-	14	2	8	0	0	-	10	29
% Single-Unit Trucks	4.8	0.0	0.0	-	-	3.2	6.0	0.0	6.7	-	-	5.3	-	3.1	4.8	-	-	3.2	10.5	2.1	0.0	-	-	2.3	3.0
Articulated Trucks	11	1	0	0	-	12	0	0	7	0	-	7	0	4	0	0	-	4	8	3	10	0	-	21	44
% Articulated Trucks	52.4	16.7	0.0	-	-	38.7	0.0	0.0	46.7	-	-	9.3	-	1.0	0.0	-	-	0.9	42.1	0.8	43.5	-	-	4.9	4.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Highway 140 & 2nd Concession
Road
Site Code: 230726
Start Date: 10/02/2024
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Turning Movement Peak Hour Data Plot (3:15 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Highway 140 & 3rd Concession Road
Site Code: 230726
Start Date: 10/02/2024
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Turning Movement Data

Start Time	3rd Concession Road Eastbound						3rd Concession Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	1	0	0	0	0	1	1	0	1	0	0	2	1	93	4	0	0	98	0	38	0	0	0	38	139
7:15 AM	0	0	1	0	0	1	1	0	0	0	0	1	0	124	0	0	0	124	0	49	0	0	0	49	175
7:30 AM	1	0	0	0	0	1	1	0	0	0	0	1	0	131	0	0	0	131	0	87	0	0	0	87	220
7:45 AM	0	0	2	0	0	2	0	0	0	0	0	0	0	114	1	0	0	115	1	75	0	0	0	76	193
Hourly Total	2	0	3	0	0	5	3	0	1	0	0	4	1	462	5	0	0	468	1	249	0	0	0	250	727
8:00 AM	0	0	1	0	0	1	5	0	1	0	0	6	2	109	0	0	0	111	0	75	0	0	0	75	193
8:15 AM	0	0	1	0	0	1	2	0	1	0	0	3	0	113	1	0	0	114	0	71	0	0	0	71	189
8:30 AM	1	0	1	0	0	2	0	0	3	0	0	3	1	75	0	0	0	76	0	75	1	0	0	76	157
8:45 AM	2	0	2	0	0	4	2	0	0	0	0	2	1	93	3	0	0	97	0	81	0	0	0	81	184
Hourly Total	3	0	5	0	0	8	9	0	5	0	0	14	4	390	4	0	0	398	0	302	1	0	0	303	723
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	0	0	0	0	0	1	0	0	0	0	1	0	69	0	0	0	69	1	67	0	0	0	68	138
11:15 AM	1	0	1	0	0	2	2	0	1	0	0	3	1	87	0	0	0	88	0	70	0	0	0	70	163
11:30 AM	0	0	0	0	0	0	0	0	2	0	0	2	0	87	3	0	0	90	0	64	0	0	0	64	156
11:45 AM	1	0	1	0	0	2	1	0	2	0	0	3	1	82	0	0	0	83	2	78	1	0	0	81	169
Hourly Total	2	0	2	0	0	4	4	0	5	0	0	9	2	325	3	0	0	330	3	279	1	0	0	283	626
12:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	70	2	0	0	72	0	86	0	0	0	86	159
12:15 PM	1	0	0	0	0	1	1	0	1	0	0	2	2	80	2	0	0	84	1	75	0	0	0	76	163
12:30 PM	1	0	0	0	0	1	0	0	0	0	0	0	0	77	2	0	0	79	2	81	0	0	0	83	163
12:45 PM	0	1	1	0	0	2	0	1	1	0	0	2	0	71	1	0	0	72	0	73	1	0	0	74	150
Hourly Total	2	1	1	0	0	4	1	1	3	0	0	5	2	298	7	0	0	307	3	315	1	0	0	319	635
1:00 PM	0	0	1	0	0	1	0	1	1	0	0	2	0	64	1	0	0	65	1	81	3	0	0	85	153
1:15 PM	1	0	1	0	0	2	0	0	0	0	0	0	0	88	3	0	0	91	2	76	0	0	0	78	171
1:30 PM	1	0	1	0	0	2	1	0	1	0	0	2	0	70	1	0	0	71	0	81	0	0	0	81	156
1:45 PM	0	0	0	0	0	0	3	1	0	0	0	4	1	75	1	0	0	77	0	55	0	0	0	55	136
Hourly Total	2	0	3	0	0	5	4	2	2	0	0	8	1	297	6	0	0	304	3	293	3	0	0	299	616
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	98	3	0	0	102	1	107	0	0	0	108	211
3:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	109	0	0	0	110	2	105	0	0	0	107	218
3:30 PM	1	0	1	0	0	2	2	0	1	0	0	3	0	105	3	0	0	108	0	124	1	0	0	125	238
3:45 PM	2	1	0	0	0	3	0	0	0	0	0	0	1	107	2	0	0	110	2	90	1	0	0	93	206
Hourly Total	3	1	1	0	0	5	2	0	3	0	0	5	3	419	8	0	0	430	5	426	2	0	0	433	873
4:00 PM	0	2	0	0	0	2	2	1	0	0	0	3	0	105	1	0	0	106	0	84	0	0	0	84	195
4:15 PM	0	0	0	0	0	0	1	0	2	0	0	3	1	78	1	0	0	80	0	128	1	0	0	129	212
4:30 PM	0	0	1	0	0	1	6	0	1	0	0	7	1	91	2	0	0	94	0	117	0	0	0	117	219

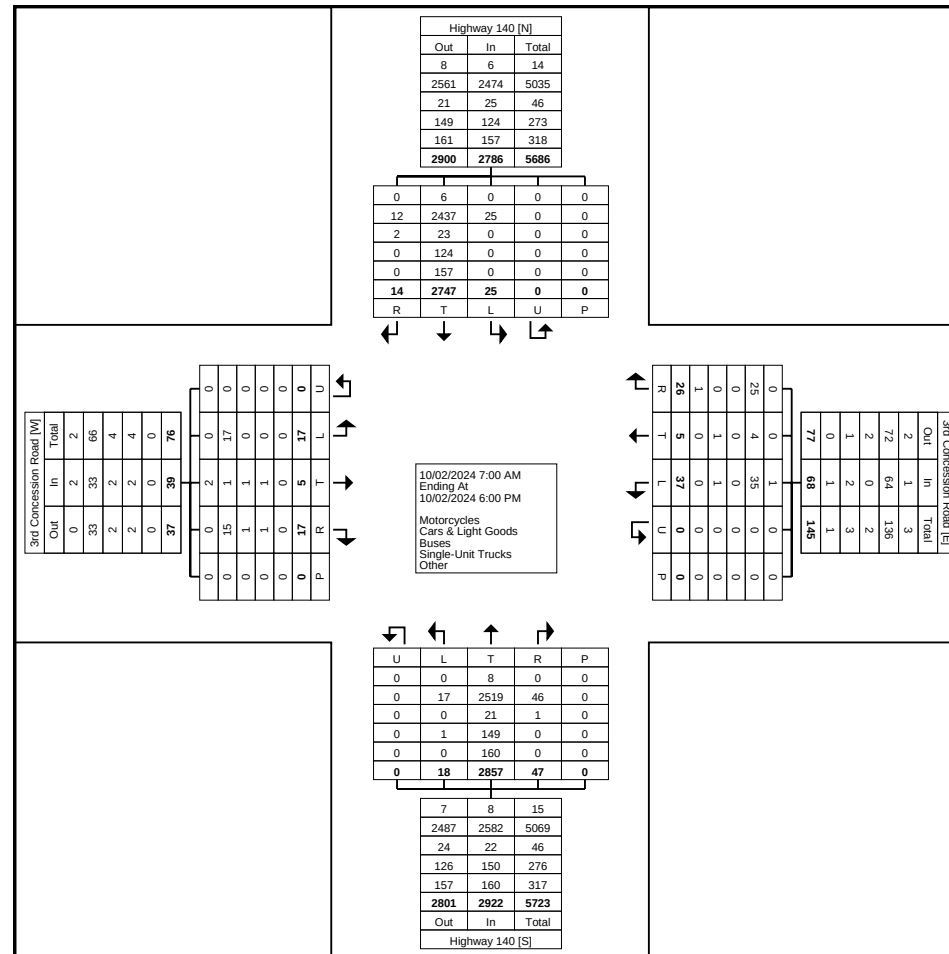
4:45 PM	0	0	1	0	0	1	1	0	2	0	0	3	0	77	4	0	0	81	0	121	0	0	0	121	206
Hourly Total	0	2	2	0	0	4	10	1	5	0	0	16	2	351	8	0	0	361	0	450	1	0	0	451	832
5:00 PM	0	1	0	0	0	1	2	0	1	0	0	3	2	91	0	0	0	93	3	108	1	0	0	112	209
5:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	1	69	4	0	0	74	1	132	2	0	0	135	210
5:30 PM	2	0	0	0	0	2	0	1	1	0	0	2	0	88	2	0	0	90	4	102	2	0	0	108	202
5:45 PM	1	0	0	0	0	1	1	0	0	0	0	1	0	67	0	0	0	67	2	91	0	0	0	93	162
Hourly Total	3	1	0	0	0	4	4	1	2	0	0	7	3	315	6	0	0	324	10	433	5	0	0	448	783
Grand Total	17	5	17	0	0	39	37	5	26	0	0	68	18	2857	47	0	0	2922	25	2747	14	0	0	2786	5815
Approach %	43.6	12.8	43.6	0.0	-	-	54.4	7.4	38.2	0.0	-	-	0.6	97.8	1.6	0.0	-	-	0.9	98.6	0.5	0.0	-	-	-
Total %	0.3	0.1	0.3	0.0	-	0.7	0.6	0.1	0.4	0.0	-	1.2	0.3	49.1	0.8	0.0	-	50.2	0.4	47.2	0.2	0.0	-	47.9	-
Motorcycles	0	2	0	0	-	2	1	0	0	0	-	1	0	8	0	0	-	8	0	6	0	0	-	6	17
% Motorcycles	0.0	40.0	0.0	-	-	5.1	2.7	0.0	0.0	-	-	1.5	0.0	0.3	0.0	-	-	0.3	0.0	0.2	0.0	-	-	0.2	0.3
Cars & Light Goods	17	1	15	0	-	33	35	4	25	0	-	64	17	2519	46	0	-	2582	25	2437	12	0	-	2474	5153
% Cars & Light Goods	100.0	20.0	88.2	-	-	84.6	94.6	80.0	96.2	-	-	94.1	94.4	88.2	97.9	-	-	88.4	100.0	88.7	85.7	-	-	88.8	88.6
Buses	0	1	1	0	-	2	0	0	0	0	-	0	0	21	1	0	-	22	0	23	2	0	-	25	49
% Buses	0.0	20.0	5.9	-	-	5.1	0.0	0.0	0.0	-	-	0.0	0.0	0.7	2.1	-	-	0.8	0.0	0.8	14.3	-	-	0.9	0.8
Single-Unit Trucks	0	1	1	0	-	2	1	1	0	0	-	2	1	149	0	0	-	150	0	124	0	0	-	124	278
% Single-Unit Trucks	0.0	20.0	5.9	-	-	5.1	2.7	20.0	0.0	-	-	2.9	5.6	5.2	0.0	-	-	5.1	0.0	4.5	0.0	-	-	4.5	4.8
Articulated Trucks	0	0	0	0	-	0	0	0	1	0	-	1	0	160	0	0	-	160	0	157	0	0	-	157	318
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	3.8	-	-	1.5	0.0	5.6	0.0	-	-	5.5	0.0	5.7	0.0	-	-	5.6	5.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



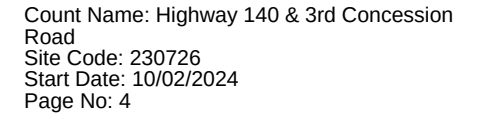
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Highway 140 & 3rd Concession
Road
Site Code: 230726
Start Date: 10/02/2024
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Turning Movement Data Plot



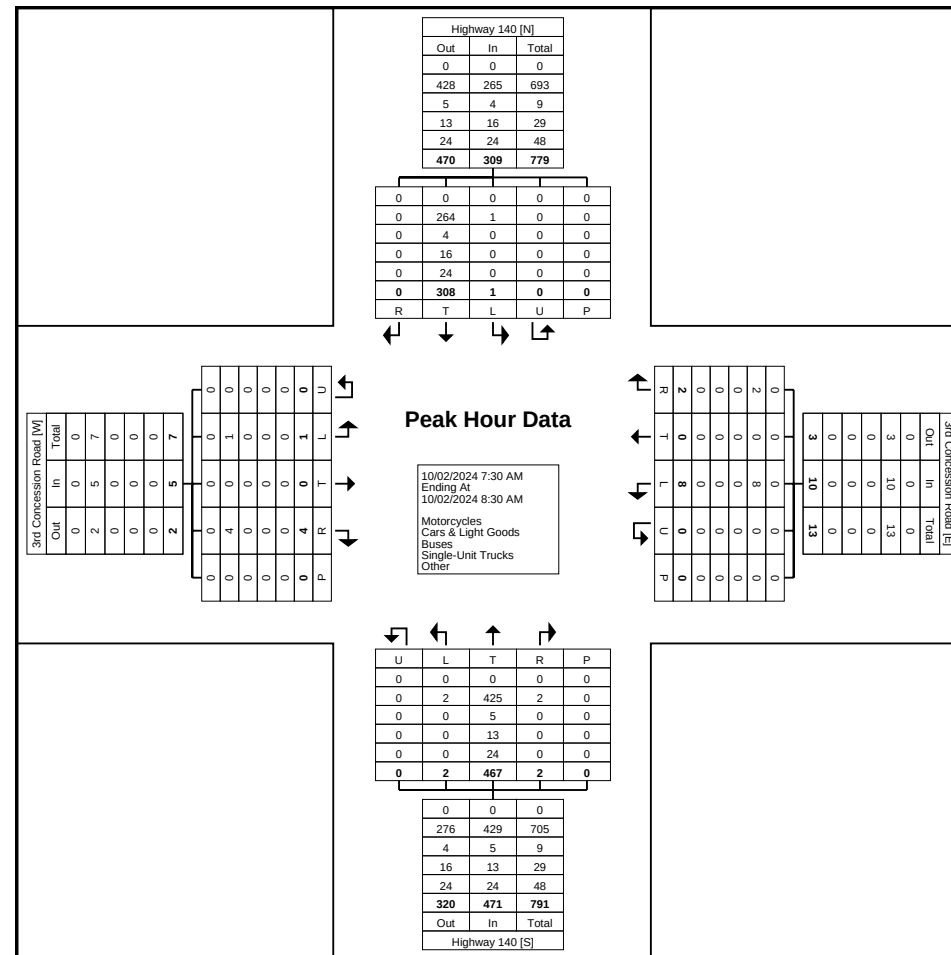
Start Time	3rd Concession Road Eastbound						3rd Concession Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	0	0	0	0	1	1	0	0	0	0	1	0	131	0	0	0	131	0	87	0	0	0	87	220
7:45 AM	0	0	2	0	0	2	0	0	0	0	0	0	0	114	1	0	0	115	1	75	0	0	0	76	193
8:00 AM	0	0	1	0	0	1	5	0	1	0	0	6	2	109	0	0	0	111	0	75	0	0	0	75	193
8:15 AM	0	0	1	0	0	1	2	0	1	0	0	3	0	113	1	0	0	114	0	71	0	0	0	71	189
Total	1	0	4	0	0	5	8	0	2	0	0	10	2	467	2	0	0	471	1	308	0	0	0	309	795
Approach %	20.0	0.0	80.0	0.0	-	-	80.0	0.0	20.0	0.0	-	-	0.4	99.2	0.4	0.0	-	-	0.3	99.7	0.0	0.0	-	-	-
Total %	0.1	0.0	0.5	0.0	-	0.6	1.0	0.0	0.3	0.0	-	1.3	0.3	58.7	0.3	0.0	-	59.2	0.1	38.7	0.0	0.0	-	38.9	-
PHF	0.250	0.000	0.500	0.000	-	0.625	0.400	0.000	0.500	0.000	-	0.417	0.250	0.891	0.500	0.000	-	0.899	0.250	0.885	0.000	0.000	-	0.888	0.903
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0
Cars & Light Goods	1	0	4	0	-	5	8	0	2	0	-	10	2	425	2	0	-	429	1	264	0	0	-	265	709
% Cars & Light Goods	100.0	-	100.0	-	-	100.0	100.0	-	100.0	-	-	100.0	100.0	91.0	100.0	-	-	91.1	100.0	85.7	-	-	-	85.8	89.2
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	5	0	0	-	5	0	4	0	0	-	4	9
% Buses	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	1.1	0.0	-	-	1.1	0.0	1.3	-	-	-	1.3	1.1
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	13	0	0	-	13	0	16	0	0	-	16	29
% Single-Unit Trucks	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	2.8	0.0	-	-	2.8	0.0	5.2	-	-	-	5.2	3.6
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	24	0	0	-	24	0	24	0	0	-	24	48
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	5.1	0.0	-	-	5.1	0.0	7.8	-	-	-	7.8	6.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Highway 140 & 3rd Concession
Road
Site Code: 230726
Start Date: 10/02/2024
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Turning Movement Peak Hour Data Plot (7:30 AM)

[illegible]

Turning Movement Peak Hour Data Plot (11:45 AM)

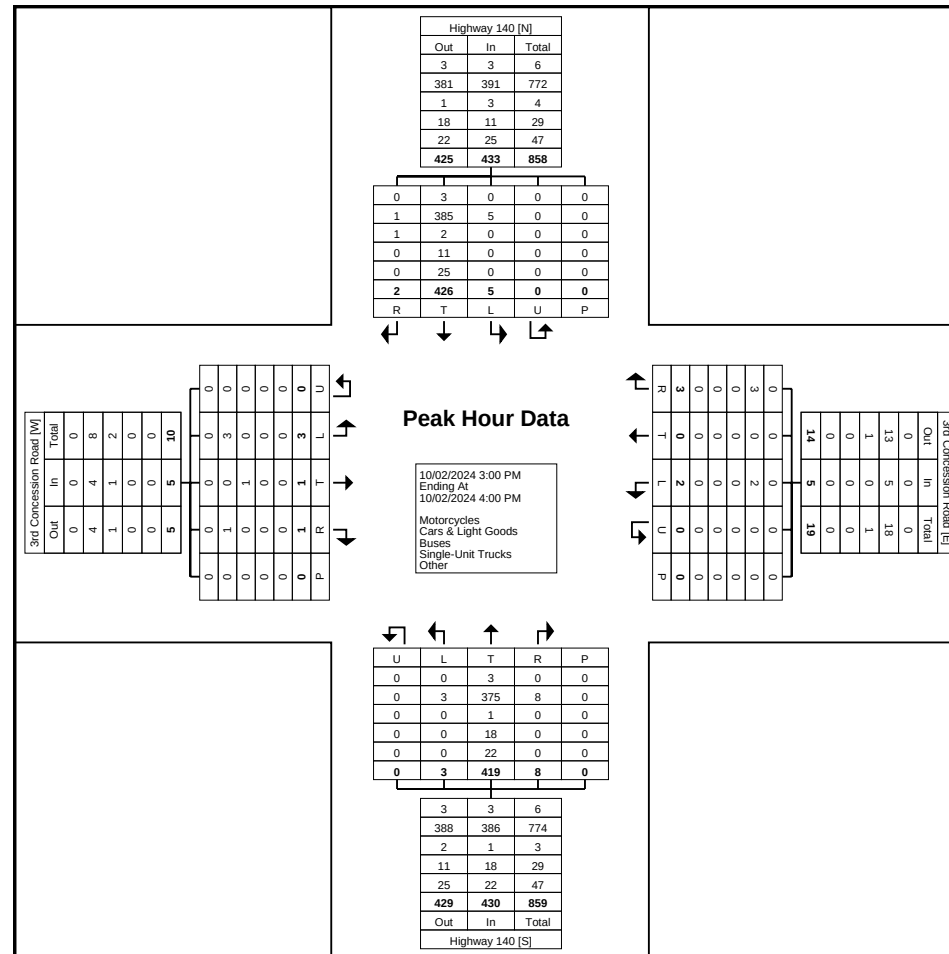
Start Time	3rd Concession Road Eastbound						3rd Concession Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:00 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	98	3	0	0	102	1	107	0	0	0	108	211
3:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	109	0	0	0	110	2	105	0	0	0	107	218
3:30 PM	1	0	1	0	0	2	2	0	1	0	0	3	0	105	3	0	0	108	0	124	1	0	0	125	238
3:45 PM	2	1	0	0	0	3	0	0	0	0	0	0	1	107	2	0	0	110	2	90	1	0	0	93	206
Total	3	1	1	0	0	5	2	0	3	0	0	5	3	419	8	0	0	430	5	426	2	0	0	433	873
Approach %	60.0	20.0	20.0	0.0	-	-	40.0	0.0	60.0	0.0	-	-	0.7	97.4	1.9	0.0	-	-	1.2	98.4	0.5	0.0	-	-	-
Total %	0.3	0.1	0.1	0.0	-	0.6	0.2	0.0	0.3	0.0	-	0.6	0.3	48.0	0.9	0.0	-	49.3	0.6	48.8	0.2	0.0	-	49.6	-
PHF	0.375	0.250	0.250	0.000	-	0.417	0.250	0.000	0.750	0.000	-	0.417	0.750	0.961	0.667	0.000	-	0.977	0.625	0.859	0.500	0.000	-	0.866	0.917
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	3	0	0	-	3	6
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.7	0.0	0.7	0.0	-	-	0.7	0.7
Cars & Light Goods	3	0	1	0	-	4	2	0	3	0	-	5	3	375	8	0	-	386	5	385	1	0	-	391	786
% Cars & Light Goods	100.0	0.0	100.0	-	-	80.0	100.0	-	100.0	-	-	100.0	100.0	89.5	100.0	-	-	89.8	100.0	90.4	50.0	-	-	90.3	90.0
Buses	0	1	0	0	-	1	0	0	0	0	-	0	0	1	0	0	-	1	0	2	1	0	-	3	5
% Buses	0.0	100.0	0.0	-	-	20.0	0.0	-	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.5	50.0	-	-	0.7	0.6
Single-Unit Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	18	0	0	-	18	0	11	0	0	-	11	29
% Single-Unit Trucks	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	4.3	0.0	-	-	4.2	0.0	2.6	0.0	-	-	2.5	3.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	22	0	0	-	22	0	25	0	0	-	25	47
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	5.3	0.0	-	-	5.1	0.0	5.9	0.0	-	-	5.8	5.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Highway 140 & 3rd Concession
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Turning Movement Peak Hour Data Plot (3:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Highway 140 & Forks Road
Site Code: 230726
Start Date: 10/02/2024
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Turning Movement Data

Start Time	Forks Road Eastbound						Forks Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	0	1	0	0	0	1	0	0	1	0	0	1	1	100	1	0	0	102	0	36	0	0	0	36	140
7:15 AM	1	0	0	0	0	1	0	1	3	0	0	4	0	112	2	0	0	114	0	51	0	0	0	51	170
7:30 AM	3	1	1	0	0	5	1	0	3	0	0	4	0	134	0	0	0	134	0	82	1	0	0	83	226
7:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	115	0	0	0	115	1	78	0	0	0	79	195
Hourly Total	4	2	1	0	0	7	1	1	8	0	0	10	1	461	3	0	0	465	1	247	1	0	0	249	731
8:00 AM	1	0	0	0	0	1	1	0	0	0	0	1	2	111	2	0	0	115	0	75	0	0	0	75	192
8:15 AM	1	0	0	0	0	1	0	0	3	0	0	3	1	112	1	0	0	114	0	70	2	0	0	72	190
8:30 AM	3	0	2	0	0	5	3	0	3	0	0	6	0	88	0	0	0	88	0	70	0	0	0	70	169
8:45 AM	0	0	0	0	0	0	0	1	1	0	0	2	2	94	0	0	0	96	2	85	0	0	0	87	185
Hourly Total	5	0	2	0	0	7	4	1	7	0	0	12	5	405	3	0	0	413	2	300	2	0	0	304	736
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	0	2	0	0	2	0	0	1	0	0	1	0	57	3	0	0	60	0	69	1	0	0	70	133
11:15 AM	0	1	0	0	0	1	2	1	1	0	0	4	0	92	0	0	0	92	1	64	2	0	0	67	164
11:30 AM	1	0	0	0	0	1	3	0	0	0	0	3	1	82	2	0	0	85	0	66	1	0	0	67	156
11:45 AM	1	1	0	0	0	2	0	0	0	0	0	0	0	95	2	0	0	97	1	83	0	0	0	84	183
Hourly Total	2	2	2	0	0	6	5	1	2	0	0	8	1	326	7	0	0	334	2	282	4	0	0	288	636
12:00 PM	2	0	2	0	0	4	0	0	0	0	0	0	3	67	0	0	0	70	0	86	0	0	0	86	160
12:15 PM	0	0	1	0	0	1	2	1	1	0	0	4	1	81	0	0	0	82	1	69	0	0	0	70	157
12:30 PM	1	0	0	0	0	1	1	1	2	0	0	4	2	81	0	0	0	83	1	76	0	0	0	77	165
12:45 PM	0	0	1	0	0	1	2	0	2	0	0	4	1	69	0	0	0	70	0	78	2	0	0	80	155
Hourly Total	3	0	4	0	0	7	5	2	5	0	0	12	7	298	0	0	0	305	2	309	2	0	0	313	637
1:00 PM	2	0	0	0	0	2	1	0	0	0	0	1	0	73	0	0	0	73	0	84	0	0	0	84	160
1:15 PM	0	0	1	0	0	1	1	0	0	0	0	1	2	81	2	0	0	85	1	72	1	0	0	74	161
1:30 PM	0	0	1	0	0	1	2	0	0	0	0	2	0	77	2	0	0	79	2	79	0	0	0	81	163
1:45 PM	0	0	0	0	0	0	2	0	1	0	0	3	0	81	1	0	0	82	0	58	3	0	0	61	146
Hourly Total	2	0	2	0	0	4	6	0	1	0	0	7	2	312	5	0	0	319	3	293	4	0	0	300	630
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	2	0	0	0	0	2	0	0	3	0	0	3	2	97	0	0	0	99	0	98	0	0	0	98	202
3:15 PM	2	0	1	0	0	3	1	2	0	0	0	3	0	109	1	0	0	110	2	114	1	0	0	117	233
3:30 PM	2	0	4	0	0	6	6	0	2	0	0	8	2	95	2	0	0	99	0	108	2	0	0	110	223
3:45 PM	1	0	1	0	0	2	0	1	0	0	0	1	1	104	3	0	0	108	2	98	4	0	0	104	215
Hourly Total	7	0	6	0	0	13	7	3	5	0	0	15	5	405	6	0	0	416	4	418	7	0	0	429	873
4:00 PM	1	1	0	0	0	2	3	0	0	0	0	3	1	100	1	0	0	102	1	79	1	0	0	81	188
4:15 PM	0	0	1	0	0	1	2	0	2	0	0	4	0	94	0	0	0	94	3	122	1	0	0	126	225
4:30 PM	2	0	1	0	0	3	0	1	3	0	0	4	0	94	1	0	0	95	3	107	4	0	0	114	216

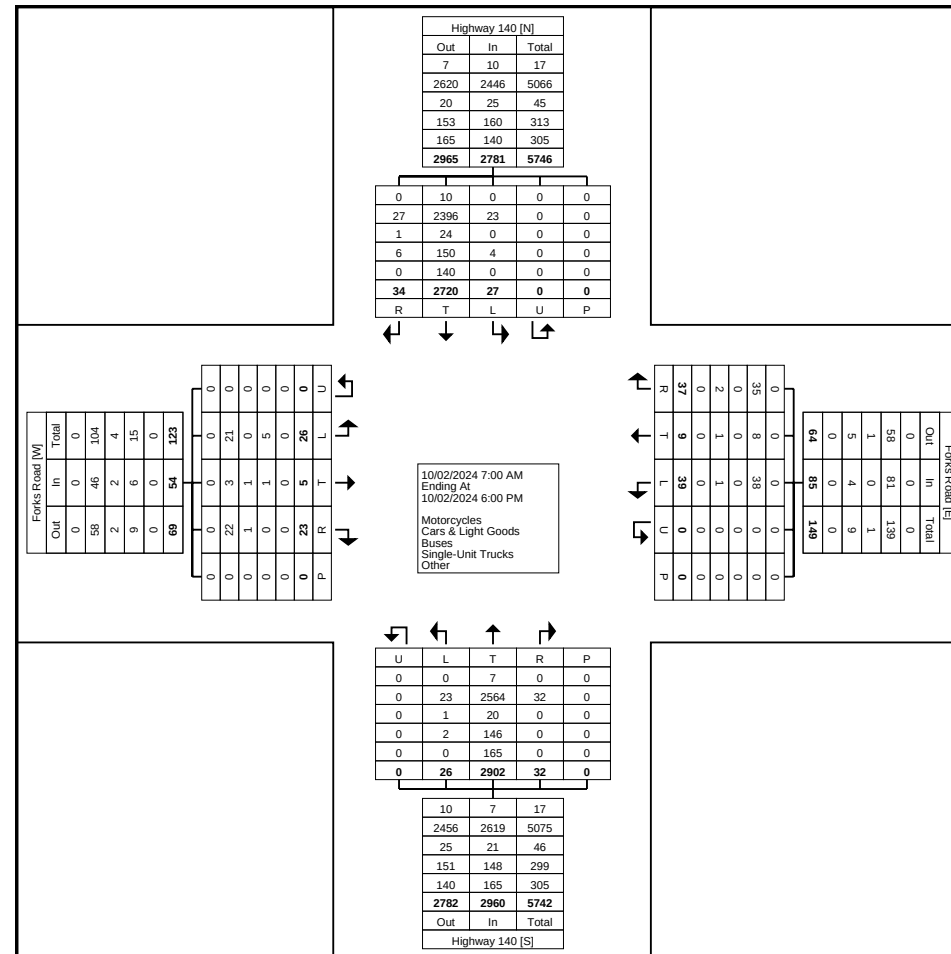
4:45 PM	0	0	4	0	0	4	0	0	0	0	0	0	0	92	0	0	0	92	3	117	3	0	0	123	219
Hourly Total	3	1	6	0	0	10	5	1	5	0	0	11	1	380	2	0	0	383	10	425	9	0	0	444	848
5:00 PM	0	0	0	0	0	0	1	0	0	0	0	1	1	89	1	0	0	91	2	110	2	0	0	114	206
5:15 PM	0	0	0	0	0	0	2	0	2	0	0	4	0	74	1	0	0	75	1	136	1	0	0	138	217
5:30 PM	0	0	0	0	0	0	0	0	1	0	0	1	1	87	3	0	0	91	0	107	0	0	0	107	199
5:45 PM	0	0	0	0	0	0	3	0	1	0	0	4	2	65	1	0	0	68	0	93	2	0	0	95	167
Hourly Total	0	0	0	0	0	0	6	0	4	0	0	10	4	315	6	0	0	325	3	446	5	0	0	454	789
Grand Total	26	5	23	0	0	54	39	9	37	0	0	85	26	2902	32	0	0	2960	27	2720	34	0	0	2781	5880
Approach %	48.1	9.3	42.6	0.0	-	-	45.9	10.6	43.5	0.0	-	-	0.9	98.0	1.1	0.0	-	-	1.0	97.8	1.2	0.0	-	-	-
Total %	0.4	0.1	0.4	0.0	-	0.9	0.7	0.2	0.6	0.0	-	1.4	0.4	49.4	0.5	0.0	-	50.3	0.5	46.3	0.6	0.0	-	47.3	-
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	7	0	0	-	7	0	10	0	0	-	10	17
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.2	0.0	-	-	0.2	0.0	0.4	0.0	-	-	0.4	0.3
Cars & Light Goods	21	3	22	0	-	46	38	8	35	0	-	81	23	2564	32	0	-	2619	23	2396	27	0	-	2446	5192
% Cars & Light Goods	80.8	60.0	95.7	-	-	85.2	97.4	88.9	94.6	-	-	95.3	88.5	88.4	100.0	-	-	88.5	85.2	88.1	79.4	-	-	88.0	88.3
Buses	0	1	1	0	-	2	0	0	0	0	-	0	1	20	0	0	-	21	0	24	1	0	-	25	48
% Buses	0.0	20.0	4.3	-	-	3.7	0.0	0.0	0.0	-	-	0.0	3.8	0.7	0.0	-	-	0.7	0.0	0.9	2.9	-	-	0.9	0.8
Single-Unit Trucks	5	1	0	0	-	6	1	1	2	0	-	4	2	146	0	0	-	148	4	150	6	0	-	160	318
% Single-Unit Trucks	19.2	20.0	0.0	-	-	11.1	2.6	11.1	5.4	-	-	4.7	7.7	5.0	0.0	-	-	5.0	14.8	5.5	17.6	-	-	5.8	5.4
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	165	0	0	-	165	0	140	0	0	-	140	305
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	5.7	0.0	-	-	5.6	0.0	5.1	0.0	-	-	5.0	5.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



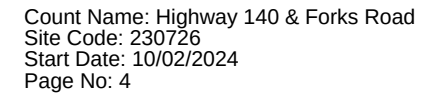
Paradigm Transportation Solutions Limited
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Count Name: Highway 140 & Forks Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 3



Turning Movement Data Plot

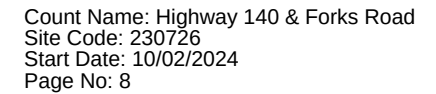


Start Time	Forks Road Eastbound						Forks Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	3	1	1	0	0	5	1	0	3	0	0	4	0	134	0	0	0	134	0	82	1	0	0	83	226
7:45 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	115	0	0	0	115	1	78	0	0	0	79	195
8:00 AM	1	0	0	0	0	1	1	0	0	0	0	1	2	111	2	0	0	115	0	75	0	0	0	75	192
8:15 AM	1	0	0	0	0	1	0	0	3	0	0	3	1	112	1	0	0	114	0	70	2	0	0	72	190
Total	5	1	1	0	0	7	2	0	7	0	0	9	3	472	3	0	0	478	1	305	3	0	0	309	803
Approach %	71.4	14.3	14.3	0.0	-	-	22.2	0.0	77.8	0.0	-	-	0.6	98.7	0.6	0.0	-	-	0.3	98.7	1.0	0.0	-	-	-
Total %	0.6	0.1	0.1	0.0	-	0.9	0.2	0.0	0.9	0.0	-	1.1	0.4	58.8	0.4	0.0	-	59.5	0.1	38.0	0.4	0.0	-	38.5	-
PHF	0.417	0.250	0.250	0.000	-	0.350	0.500	0.000	0.583	0.000	-	0.563	0.375	0.881	0.375	0.000	-	0.892	0.250	0.930	0.375	0.000	-	0.931	0.888
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Cars & Light Goods	4	1	1	0	-	6	2	0	7	0	-	9	2	429	3	0	-	434	1	262	3	0	-	266	715
% Cars & Light Goods	80.0	100.0	100.0	-	-	85.7	100.0	-	100.0	-	-	100.0	66.7	90.9	100.0	-	-	90.8	100.0	85.9	100.0	-	-	86.1	89.0
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	6	0	0	-	6	0	4	0	0	-	4	10
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	1.3	0.0	-	-	1.3	0.0	1.3	0.0	-	-	1.3	1.2
Single-Unit Trucks	1	0	0	0	-	1	0	0	0	0	-	0	1	15	0	0	-	16	0	23	0	0	-	23	40
% Single-Unit Trucks	20.0	0.0	0.0	-	-	14.3	0.0	-	0.0	-	-	0.0	33.3	3.2	0.0	-	-	3.3	0.0	7.5	0.0	-	-	7.4	5.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	22	0	0	-	22	0	16	0	0	-	16	38
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	4.7	0.0	-	-	4.6	0.0	5.2	0.0	-	-	5.2	4.7
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)

Start Time	Forks Road Eastbound						Forks Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total	
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total		
11:45 AM	1	1	0	0	0	2	0	0	0	0	0	0	0	95	2	0	0	0	97	1	83	0	0	0	84	183
12:00 PM	2	0	2	0	0	4	0	0	0	0	0	0	3	67	0	0	0	70	0	86	0	0	0	86	160	
12:15 PM	0	0	1	0	0	1	2	1	1	0	0	4	1	81	0	0	0	82	1	69	0	0	0	70	157	
12:30 PM	1	0	0	0	0	1	1	1	2	0	0	4	2	81	0	0	0	83	1	76	0	0	0	77	165	
Total	4	1	3	0	0	8	3	2	3	0	0	8	6	324	2	0	0	332	3	314	0	0	0	317	665	
Approach %	50.0	12.5	37.5	0.0	-	-	37.5	25.0	37.5	0.0	-	-	1.8	97.6	0.6	0.0	-	-	0.9	99.1	0.0	0.0	-	-	-	
Total %	0.6	0.2	0.5	0.0	-	1.2	0.5	0.3	0.5	0.0	-	1.2	0.9	48.7	0.3	0.0	-	49.9	0.5	47.2	0.0	0.0	-	47.7	-	
PHF	0.500	0.250	0.375	0.000	-	0.500	0.375	0.500	0.375	0.000	-	0.500	0.500	0.853	0.250	0.000	-	0.856	0.750	0.913	0.000	0.000	-	0.922	0.908	
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	1	0	0	-	1	0	1	0	0	-	1	2	
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.3	0.0	-	-	0.3	0.0	0.3	-	-	-	0.3	0.3	
Cars & Light Goods	4	0	3	0	-	7	3	2	2	0	-	7	6	261	2	0	-	269	3	250	0	0	-	253	536	
% Cars & Light Goods	100.0	0.0	100.0	-	-	87.5	100.0	100.0	66.7	-	-	87.5	100.0	80.6	100.0	-	-	81.0	100.0	79.6	-	-	-	79.8	80.6	
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	5	0	0	-	5	5	
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.6	-	-	-	1.6	0.8	
Single-Unit Trucks	0	1	0	0	-	1	0	0	1	0	-	1	0	31	0	0	-	31	0	30	0	0	-	30	63	
% Single-Unit Trucks	0.0	100.0	0.0	-	-	12.5	0.0	0.0	33.3	-	-	12.5	0.0	9.6	0.0	-	-	9.3	0.0	9.6	-	-	-	9.5	9.5	
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	31	0	0	-	31	0	28	0	0	-	28	59	
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	9.6	0.0	-	-	9.3	0.0	8.9	-	-	-	8.8	8.9	
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	-	0.0	0.0	
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Turning Movement Peak Hour Data Plot (11:45 AM)



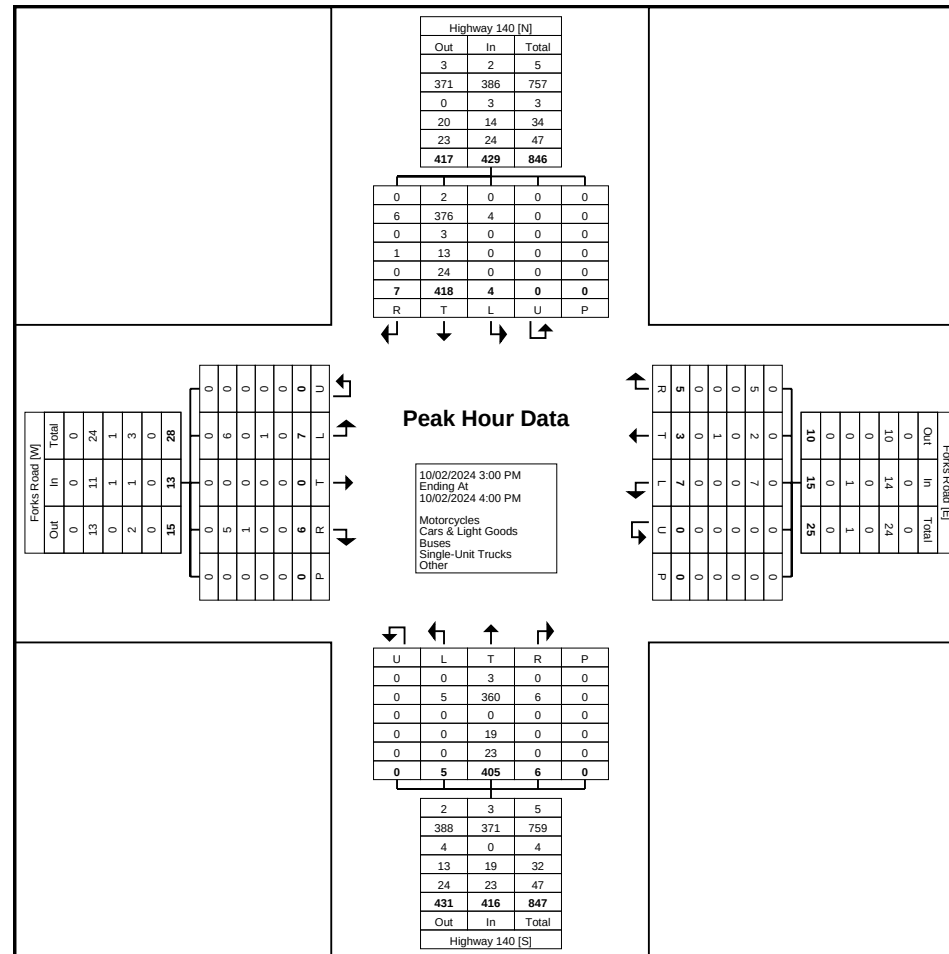
Start Time	Forks Road Eastbound						Forks Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
3:00 PM	2	0	0	0	0	2	0	0	3	0	0	3	2	97	0	0	0	99	0	98	0	0	0	98	202
3:15 PM	2	0	1	0	0	3	1	2	0	0	0	3	0	109	1	0	0	110	2	114	1	0	0	117	233
3:30 PM	2	0	4	0	0	6	6	0	2	0	0	8	2	95	2	0	0	99	0	108	2	0	0	110	223
3:45 PM	1	0	1	0	0	2	0	1	0	0	0	1	1	104	3	0	0	108	2	98	4	0	0	104	215
Total	7	0	6	0	0	13	7	3	5	0	0	15	5	405	6	0	0	416	4	418	7	0	0	429	873
Approach %	53.8	0.0	46.2	0.0	-	-	46.7	20.0	33.3	0.0	-	-	1.2	97.4	1.4	0.0	-	-	0.9	97.4	1.6	0.0	-	-	-
Total %	0.8	0.0	0.7	0.0	-	1.5	0.8	0.3	0.6	0.0	-	1.7	0.6	46.4	0.7	0.0	-	47.7	0.5	47.9	0.8	0.0	-	49.1	-
PHF	0.875	0.000	0.375	0.000	-	0.542	0.292	0.375	0.417	0.000	-	0.469	0.625	0.929	0.500	0.000	-	0.945	0.500	0.917	0.438	0.000	-	0.917	0.937
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	0	2	0	0	-	2	5
% Motorcycles	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.7	0.0	0.5	0.0	-	-	0.5	0.6
Cars & Light Goods	6	0	5	0	-	11	7	2	5	0	-	14	5	360	6	0	-	371	4	376	6	0	-	386	782
% Cars & Light Goods	85.7	-	83.3	-	-	84.6	100.0	66.7	100.0	-	-	93.3	100.0	88.9	100.0	-	-	89.2	100.0	90.0	85.7	-	-	90.0	89.6
Buses	0	0	1	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	0	3	0	0	-	3	4
% Buses	0.0	-	16.7	-	-	7.7	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.7	0.0	-	-	0.7	0.5
Single-Unit Trucks	1	0	0	0	-	1	0	1	0	0	-	1	0	19	0	0	-	19	0	13	1	0	-	14	35
% Single-Unit Trucks	14.3	-	0.0	-	-	7.7	0.0	33.3	0.0	-	-	6.7	0.0	4.7	0.0	-	-	4.6	0.0	3.1	14.3	-	-	3.3	4.0
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	23	0	0	-	23	0	24	0	0	-	24	47
% Articulated Trucks	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	5.7	0.0	-	-	5.5	0.0	5.7	0.0	-	-	5.6	5.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
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Count Name: Highway 140 & Forks Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 9



Turning Movement Peak Hour Data Plot (3:00 PM)



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Highway 140 & Netherby Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 1

Turning Movement Data

Start Time	Netherby Road Eastbound						Netherby Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	20	0	2	0	0	22	1	0	11	0	0	12	3	89	4	0	0	96	5	37	20	0	0	62	192
7:15 AM	20	0	5	0	0	25	0	0	7	0	0	7	1	123	6	0	0	130	6	50	23	0	0	79	241
7:30 AM	25	0	9	0	0	34	2	0	12	0	0	14	8	117	3	0	0	128	8	77	26	1	0	112	288
7:45 AM	24	2	12	0	0	38	3	0	15	0	0	18	8	100	9	0	0	117	15	63	25	0	0	103	276
Hourly Total	89	2	28	0	0	119	6	0	45	0	0	51	20	429	22	0	0	471	34	227	94	1	0	356	997
8:00 AM	27	0	7	0	0	34	2	0	3	0	0	5	6	104	7	0	0	117	11	68	26	0	0	105	261
8:15 AM	22	0	3	0	0	25	2	0	10	0	0	12	5	109	1	0	0	115	6	72	22	0	0	100	252
8:30 AM	17	0	3	0	0	20	4	0	12	0	0	16	7	84	0	0	0	91	6	75	20	1	0	102	229
8:45 AM	15	0	8	0	0	23	2	0	8	0	0	10	7	86	4	1	0	98	4	60	10	2	0	76	207
Hourly Total	81	0	21	0	0	102	10	0	33	0	0	43	25	383	12	1	0	421	27	275	78	3	0	383	949
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	9	1	10	0	0	20	1	0	9	0	0	10	4	52	3	0	0	59	5	50	21	0	0	76	165
11:15 AM	13	1	6	0	0	20	0	0	14	0	0	14	3	82	7	0	0	92	8	64	14	0	0	86	212
11:30 AM	12	0	3	0	0	15	3	0	11	0	0	14	3	79	3	0	0	85	6	70	14	0	0	90	204
11:45 AM	9	2	11	0	0	22	3	1	11	0	0	15	9	69	10	0	0	88	6	67	11	0	0	84	209
Hourly Total	43	4	30	0	0	77	7	1	45	0	0	53	19	282	23	0	0	324	25	251	60	0	0	336	790
12:00 PM	13	3	4	0	0	20	1	1	11	0	0	13	5	61	3	0	0	69	7	81	13	0	0	101	203
12:15 PM	12	1	4	0	0	17	2	0	10	0	0	12	8	80	4	1	0	93	10	70	17	0	0	97	219
12:30 PM	17	1	8	0	0	26	3	1	9	0	0	13	9	74	6	0	0	89	7	66	14	0	0	87	215
12:45 PM	10	0	5	0	0	15	0	1	10	0	0	11	6	55	6	0	0	67	5	80	9	0	0	94	187
Hourly Total	52	5	21	0	0	78	6	3	40	0	0	49	28	270	19	1	0	318	29	297	53	0	0	379	824
1:00 PM	17	1	10	0	0	28	1	2	9	0	0	12	7	67	6	0	0	80	5	67	14	0	0	86	206
1:15 PM	12	0	12	0	0	24	1	1	7	0	0	9	2	64	7	0	0	73	4	66	21	0	0	91	197
1:30 PM	13	0	3	0	0	16	2	1	15	0	0	18	6	58	5	0	0	69	5	71	15	3	0	94	197
1:45 PM	10	1	3	0	0	14	4	0	14	0	0	18	8	65	8	0	0	81	4	54	12	0	0	70	183
Hourly Total	52	2	28	0	0	82	8	4	45	0	0	57	23	254	26	0	0	303	18	258	62	3	0	341	783
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	19	0	4	0	0	23	3	0	15	0	0	18	8	83	8	0	0	99	7	88	27	0	0	122	262
3:15 PM	15	0	9	0	0	24	5	0	11	0	0	16	5	98	9	1	0	113	9	109	30	1	0	149	302
3:30 PM	20	0	13	0	0	33	4	0	17	0	0	21	8	92	4	0	0	104	14	92	32	0	0	138	296
3:45 PM	20	0	15	0	0	35	5	1	14	0	0	20	6	90	6	0	0	102	9	85	19	0	0	113	270
Hourly Total	74	0	41	0	0	115	17	1	57	0	0	75	27	363	27	1	0	418	39	374	108	1	0	522	1130
4:00 PM	17	1	4	0	0	22	3	1	12	0	0	16	11	91	11	0	0	113	9	82	30	0	0	121	272
4:15 PM	15	0	17	0	0	32	2	0	14	0	0	16	10	79	10	1	0	100	10	119	29	1	0	159	307
4:30 PM	16	1	10	0	0	27	2	0	10	0	0	12	9	77	4	0	0	90	8	109	24	0	0	141	270

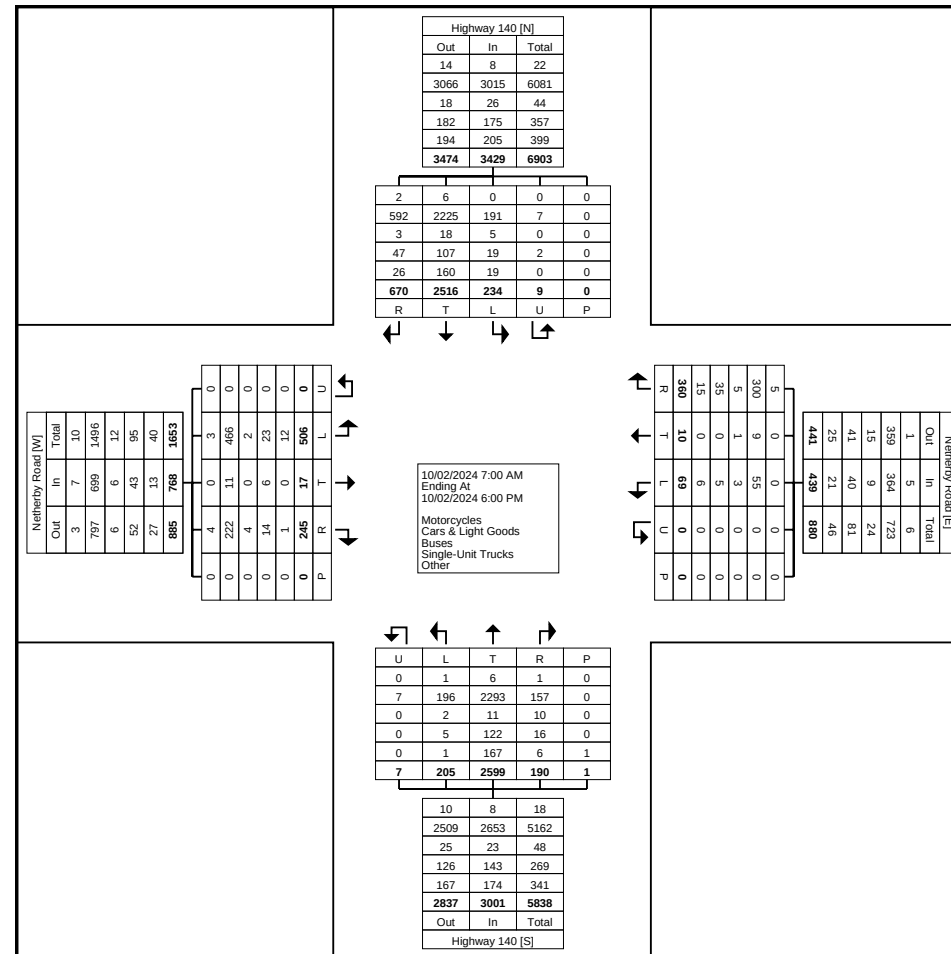
4:45 PM	15	1	7	0	0	23	1	0	9	0	0	10	8	86	7	0	0	101	2	116	22	0	0	140	274
Hourly Total	63	3	38	0	0	104	8	1	45	0	0	54	38	333	32	1	0	404	29	426	105	1	0	561	1123
5:00 PM	22	1	12	0	0	35	3	0	10	0	0	13	10	80	13	2	0	105	9	104	31	0	0	144	297
5:15 PM	16	0	11	0	0	27	0	0	13	0	0	13	10	67	5	1	0	83	2	120	25	0	0	147	270
5:30 PM	8	0	9	0	0	17	2	0	14	0	0	16	3	74	7	0	0	84	11	94	25	0	0	130	247
5:45 PM	6	0	6	0	0	12	2	0	13	0	0	15	2	64	4	0	1	70	11	90	29	0	0	130	227
Hourly Total	52	1	38	0	0	91	7	0	50	0	0	57	25	285	29	3	1	342	33	408	110	0	0	551	1041
Grand Total	506	17	245	0	0	768	69	10	360	0	0	439	205	2599	190	7	1	3001	234	2516	670	9	0	3429	7637
Approach %	65.9	2.2	31.9	0.0	-	-	15.7	2.3	82.0	0.0	-	-	6.8	86.6	6.3	0.2	-	-	6.8	73.4	19.5	0.3	-	-	-
Total %	6.6	0.2	3.2	0.0	-	10.1	0.9	0.1	4.7	0.0	-	5.7	2.7	34.0	2.5	0.1	-	39.3	3.1	32.9	8.8	0.1	-	44.9	-
Motorcycles	3	0	4	0	-	7	0	0	5	0	-	5	1	6	1	0	-	8	0	6	2	0	-	8	28
% Motorcycles	0.6	0.0	1.6	-	-	0.9	0.0	0.0	1.4	-	-	1.1	0.5	0.2	0.5	0.0	-	0.3	0.0	0.2	0.3	0.0	-	0.2	0.4
Cars & Light Goods	466	11	222	0	-	699	55	9	300	0	-	364	196	2293	157	7	-	2653	191	2225	592	7	-	3015	6731
% Cars & Light Goods	92.1	64.7	90.6	-	-	91.0	79.7	90.0	83.3	-	-	82.9	95.6	88.2	82.6	100.0	-	88.4	81.6	88.4	88.4	77.8	-	87.9	88.1
Buses	2	0	4	0	-	6	3	1	5	0	-	9	2	11	10	0	-	23	5	18	3	0	-	26	64
% Buses	0.4	0.0	1.6	-	-	0.8	4.3	10.0	1.4	-	-	2.1	1.0	0.4	5.3	0.0	-	0.8	2.1	0.7	0.4	0.0	-	0.8	0.8
Single-Unit Trucks	23	6	14	0	-	43	5	0	35	0	-	40	5	122	16	0	-	143	19	107	47	2	-	175	401
% Single-Unit Trucks	4.5	35.3	5.7	-	-	5.6	7.2	0.0	9.7	-	-	9.1	2.4	4.7	8.4	0.0	-	4.8	8.1	4.3	7.0	22.2	-	5.1	5.3
Articulated Trucks	12	0	1	0	-	13	6	0	15	0	-	21	1	167	6	0	-	174	19	160	26	0	-	205	413
% Articulated Trucks	2.4	0.0	0.4	-	-	1.7	8.7	0.0	4.2	-	-	4.8	0.5	6.4	3.2	0.0	-	5.8	8.1	6.4	3.9	0.0	-	6.0	5.4
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsl.com

Count Name: Highway 140 & Netherby Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 3



Turning Movement Data Plot



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Highway 140 & Netherby Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 4

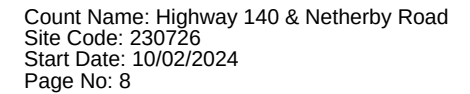
Approach Data

Start Time	Eb Street Eastbound						Wb Street Westbound						Nb Street Northbound						Sb Street Southbound					
	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next	Peds CCW	Peds CW	Circulating	Out	In	Next
7:00 AM	0	0	44	23	22	20	0	0	111	9	12	0	0	0	25	41	95	4	0	0	4	120	63	37
7:15 AM	0	0	56	24	26	20	0	0	146	11	7	0	0	0	27	54	131	6	0	0	1	150	79	50
7:30 AM	0	0	87	35	33	25	0	0	148	12	13	0	0	0	33	88	126	3	0	0	10	156	111	77
7:45 AM	0	0	81	33	37	24	0	0	129	25	18	0	0	0	40	78	115	9	0	0	12	141	103	63
Hourly Total	0	0	268	115	118	89	0	0	534	57	50	0	0	0	125	261	467	22	0	0	27	567	356	227
8:00 AM	0	0	80	32	34	27	0	0	137	18	5	0	0	0	38	77	117	7	0	0	8	133	104	68
8:15 AM	0	0	81	27	25	22	0	0	135	6	12	0	0	0	28	78	115	1	0	0	7	142	101	72
8:30 AM	0	0	86	27	20	17	0	0	112	6	16	0	0	0	23	81	92	0	0	0	10	113	102	75
8:45 AM	0	0	69	17	24	15	0	0	110	8	10	0	0	0	21	71	97	4	0	0	11	112	76	60
Hourly Total	0	0	316	103	103	81	0	0	494	38	43	0	0	0	110	307	421	12	0	0	36	500	383	275
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	0	55	25	20	9	0	0	67	8	10	0	0	0	15	61	60	3	0	0	5	71	75	50
11:15 AM	0	0	72	17	20	13	0	0	99	16	14	0	0	0	22	70	93	7	0	0	4	110	86	64
11:30 AM	0	0	79	17	15	12	0	0	94	10	14	0	0	0	18	76	85	3	0	0	6	103	90	70
11:45 AM	0	0	77	20	22	9	0	0	89	18	15	1	0	0	17	81	90	10	0	0	12	88	85	67
Hourly Total	0	0	283	79	77	43	0	0	349	52	53	1	0	0	72	288	328	23	0	0	27	372	336	251
12:00 PM	0	0	89	18	21	13	0	0	79	13	14	1	0	0	24	86	69	3	0	0	8	84	101	81
12:15 PM	0	0	85	25	16	12	0	0	102	14	13	0	0	0	22	77	94	4	0	0	11	103	99	70
12:30 PM	0	0	76	24	26	17	0	0	99	14	12	1	0	0	26	76	89	6	0	0	13	101	87	66
12:45 PM	0	0	85	16	15	10	0	0	72	11	11	1	0	0	15	87	68	6	0	0	7	75	94	80
Hourly Total	0	0	335	83	78	52	0	0	352	52	50	3	0	0	87	326	320	19	0	0	39	363	381	297
1:00 PM	0	0	75	23	29	17	0	0	93	12	12	2	0	0	25	77	81	6	0	0	10	93	88	67
1:15 PM	0	0	73	23	25	12	0	0	78	11	9	1	0	0	16	79	73	7	0	0	4	84	92	66
1:30 PM	0	0	81	21	16	13	0	0	79	10	19	1	0	0	21	76	69	5	0	0	10	89	94	71
1:45 PM	0	0	62	21	13	10	0	0	83	13	18	0	0	0	14	61	81	8	0	0	12	89	70	54
Hourly Total	0	0	291	88	83	52	0	0	333	46	58	4	0	0	76	293	304	26	0	0	36	355	344	258
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	0	0	98	35	24	19	0	0	112	15	18	0	0	0	27	96	100	8	0	0	11	119	122	88
3:15 PM	0	0	124	35	24	15	0	0	120	18	16	0	0	0	25	123	113	9	0	0	11	125	148	109
3:30 PM	0	0	110	40	33	20	0	0	121	18	21	0	0	0	34	110	105	4	0	0	12	128	138	92
3:45 PM	0	0	99	26	36	20	0	0	117	15	20	1	0	0	30	104	103	6	0	0	13	124	113	85
Hourly Total	0	0	431	136	117	74	0	0	470	66	75	1	0	0	116	433	421	27	0	0	47	496	521	374
4:00 PM	0	0	94	42	22	17	0	0	120	21	16	1	0	0	27	89	113	11	0	0	15	119	121	82
4:15 PM	0	0	131	39	32	15	0	0	106	20	16	0	0	0	26	139	100	10	0	0	13	109	158	119
4:30 PM	0	0	118	33	27	16	0	0	102	12	12	0	0	0	25	121	90	4	0	0	11	104	140	109

[illegible]

Start Time	Netherby Road Eastbound						Netherby Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	25	0	9	0	0	34	2	0	12	0	0	14	8	117	3	0	0	128	8	77	26	1	0	112	288
7:45 AM	24	2	12	0	0	38	3	0	15	0	0	18	8	100	9	0	0	117	15	63	25	0	0	103	276
8:00 AM	27	0	7	0	0	34	2	0	3	0	0	5	6	104	7	0	0	117	11	68	26	0	0	105	261
8:15 AM	22	0	3	0	0	25	2	0	10	0	0	12	5	109	1	0	0	115	6	72	22	0	0	100	252
Total	98	2	31	0	0	131	9	0	40	0	0	49	27	430	20	0	0	477	40	280	99	1	0	420	1077
Approach %	74.8	1.5	23.7	0.0	-	-	18.4	0.0	81.6	0.0	-	-	5.7	90.1	4.2	0.0	-	-	9.5	66.7	23.6	0.2	-	-	-
Total %	9.1	0.2	2.9	0.0	-	12.2	0.8	0.0	3.7	0.0	-	4.5	2.5	39.9	1.9	0.0	-	44.3	3.7	26.0	9.2	0.1	-	39.0	-
PHF	0.907	0.250	0.646	0.000	-	0.862	0.750	0.000	0.667	0.000	-	0.681	0.844	0.919	0.556	0.000	-	0.932	0.667	0.909	0.952	0.250	-	0.938	0.935
Motorcycles	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Cars & Light Goods	93	1	30	0	-	124	7	0	31	0	-	38	25	394	15	0	-	434	32	238	84	1	-	355	951
% Cars & Light Goods	94.9	50.0	96.8	-	-	94.7	77.8	-	77.5	-	-	77.6	92.6	91.6	75.0	-	-	91.0	80.0	85.0	84.8	100.0	-	84.5	88.3
Buses	0	0	1	0	-	1	1	0	1	0	-	2	1	1	4	0	-	6	3	3	1	0	-	7	16
% Buses	0.0	0.0	3.2	-	-	0.8	11.1	-	2.5	-	-	4.1	3.7	0.2	20.0	-	-	1.3	7.5	1.1	1.0	0.0	-	1.7	1.5
Single-Unit Trucks	4	1	0	0	-	5	0	0	7	0	-	7	1	14	0	0	-	15	4	13	7	0	-	24	51
% Single-Unit Trucks	4.1	50.0	0.0	-	-	3.8	0.0	-	17.5	-	-	14.3	3.7	3.3	0.0	-	-	3.1	10.0	4.6	7.1	0.0	-	5.7	4.7
Articulated Trucks	1	0	0	0	-	1	1	0	1	0	-	2	0	21	1	0	-	22	1	26	7	0	-	34	59
% Articulated Trucks	1.0	0.0	0.0	-	-	0.8	11.1	-	2.5	-	-	4.1	0.0	4.9	5.0	-	-	4.6	2.5	9.3	7.1	0.0	-	8.1	5.5
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Movement Peak Hour Data Plot (7:30 AM)



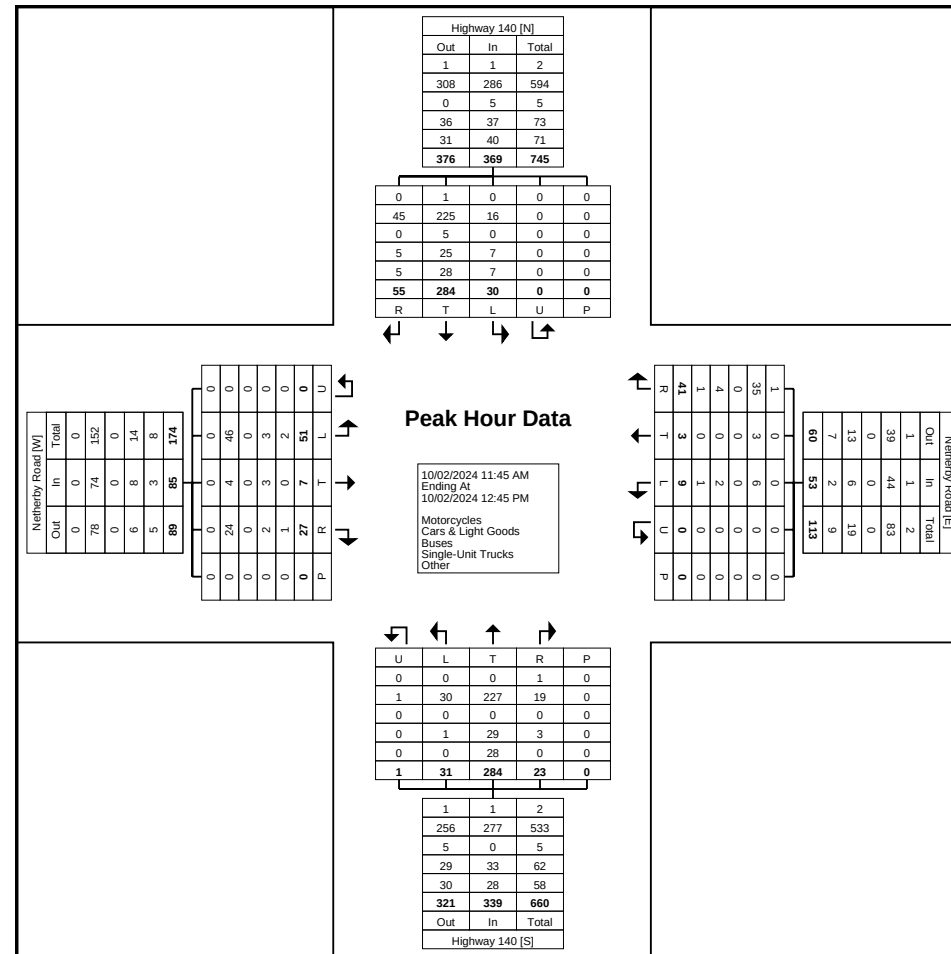
Start Time	Netherby Road Eastbound						Netherby Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
11:45 AM	9	2	11	0	0	22	3	1	11	0	0	15	9	69	10	0	0	88	6	67	11	0	0	84	209
12:00 PM	13	3	4	0	0	20	1	1	11	0	0	13	5	61	3	0	0	69	7	81	13	0	0	101	203
12:15 PM	12	1	4	0	0	17	2	0	10	0	0	12	8	80	4	1	0	93	10	70	17	0	0	97	219
12:30 PM	17	1	8	0	0	26	3	1	9	0	0	13	9	74	6	0	0	89	7	66	14	0	0	87	215
Total	51	7	27	0	0	85	9	3	41	0	0	53	31	284	23	1	0	339	30	284	55	0	0	369	846
Approach %	60.0	8.2	31.8	0.0	-	-	17.0	5.7	77.4	0.0	-	-	9.1	83.8	6.8	0.3	-	-	8.1	77.0	14.9	0.0	-	-	-
Total %	6.0	0.8	3.2	0.0	-	10.0	1.1	0.4	4.8	0.0	-	6.3	3.7	33.6	2.7	0.1	-	40.1	3.5	33.6	6.5	0.0	-	43.6	-
PHF	0.750	0.583	0.614	0.000	-	0.817	0.750	0.750	0.932	0.000	-	0.883	0.861	0.888	0.575	0.250	-	0.911	0.750	0.877	0.809	0.000	-	0.913	0.966
Motorcycles	0	0	0	0	-	0	0	0	1	0	-	1	0	0	1	0	-	1	0	1	0	0	-	1	3
% Motorcycles	0.0	0.0	0.0	-	-	0.0	0.0	0.0	2.4	-	-	1.9	0.0	0.0	4.3	0.0	-	0.3	0.0	0.4	0.0	-	-	0.3	0.4
Cars & Light Goods	46	4	24	0	-	74	6	3	35	0	-	44	30	227	19	1	-	277	16	225	45	0	-	286	681
% Cars & Light Goods	90.2	57.1	88.9	-	-	87.1	66.7	100.0	85.4	-	-	83.0	96.8	79.9	82.6	100.0	-	81.7	53.3	79.2	81.8	-	-	77.5	80.5
Buses	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	5	0	0	-	5	5
% Buses	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	1.8	0.0	-	-	1.4	0.6
Single-Unit Trucks	3	3	2	0	-	8	2	0	4	0	-	6	1	29	3	0	-	33	7	25	5	0	-	37	84
% Single-Unit Trucks	5.9	42.9	7.4	-	-	9.4	22.2	0.0	9.8	-	-	11.3	3.2	10.2	13.0	0.0	-	9.7	23.3	8.8	9.1	-	-	10.0	9.9
Articulated Trucks	2	0	1	0	-	3	1	0	1	0	-	2	0	28	0	0	-	28	7	28	5	0	-	40	73
% Articulated Trucks	3.9	0.0	3.7	-	-	3.5	11.1	0.0	2.4	-	-	3.8	0.0	9.9	0.0	0.0	-	8.3	23.3	9.9	9.1	-	-	10.8	8.6
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



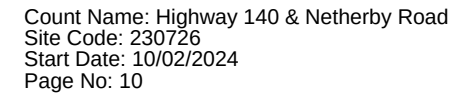
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cdowness@pts1.com

Count Name: Highway 140 & Netherby Road
Site Code: 230726
Start Date: 10/02/2024
Page No: 9



Turning Movement Peak Hour Data Plot (11:45 AM)



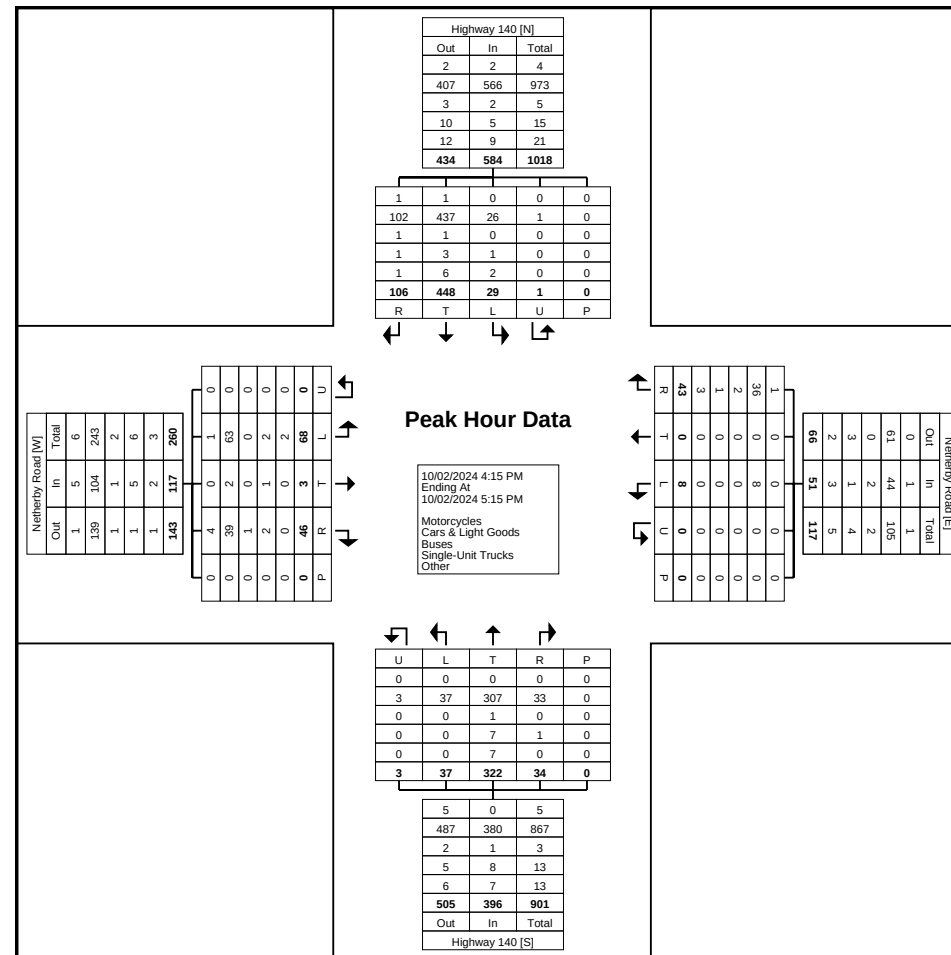
Start Time	Netherby Road Eastbound						Netherby Road Westbound						Highway 140 Northbound						Highway 140 Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	15	0	17	0	0	32	2	0	14	0	0	16	10	79	10	1	0	100	10	119	29	1	0	159	307
4:30 PM	16	1	10	0	0	27	2	0	10	0	0	12	9	77	4	0	0	90	8	109	24	0	0	141	270
4:45 PM	15	1	7	0	0	23	1	0	9	0	0	10	8	86	7	0	0	101	2	116	22	0	0	140	274
5:00 PM	22	1	12	0	0	35	3	0	10	0	0	13	10	80	13	2	0	105	9	104	31	0	0	144	297
Total	68	3	46	0	0	117	8	0	43	0	0	51	37	322	34	3	0	396	29	448	106	1	0	584	1148
Approach %	58.1	2.6	39.3	0.0	-	-	15.7	0.0	84.3	0.0	-	-	9.3	81.3	8.6	0.8	-	-	5.0	76.7	18.2	0.2	-	-	-
Total %	5.9	0.3	4.0	0.0	-	10.2	0.7	0.0	3.7	0.0	-	4.4	3.2	28.0	3.0	0.3	-	34.5	2.5	39.0	9.2	0.1	-	50.9	-
PHF	0.773	0.750	0.676	0.000	-	0.836	0.667	0.000	0.768	0.000	-	0.797	0.925	0.936	0.654	0.375	-	0.943	0.725	0.941	0.855	0.250	-	0.918	0.935
Motorcycles	1	0	4	0	-	5	0	0	1	0	-	1	0	0	0	0	-	0	0	1	1	0	-	2	8
% Motorcycles	1.5	0.0	8.7	-	-	4.3	0.0	-	2.3	-	-	2.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.2	0.9	0.0	-	0.3	0.7
Cars & Light Goods	63	2	39	0	-	104	8	0	36	0	-	44	37	307	33	3	-	380	26	437	102	1	-	566	1094
% Cars & Light Goods	92.6	66.7	84.8	-	-	88.9	100.0	-	83.7	-	-	86.3	100.0	95.3	97.1	100.0	-	96.0	89.7	97.5	96.2	100.0	-	96.9	95.3
Buses	0	0	1	0	-	1	0	0	2	0	-	2	0	1	0	0	-	1	0	1	1	0	-	2	6
% Buses	0.0	0.0	2.2	-	-	0.9	0.0	-	4.7	-	-	3.9	0.0	0.3	0.0	0.0	-	0.3	0.0	0.2	0.9	0.0	-	0.3	0.5
Single-Unit Trucks	2	1	2	0	-	5	0	0	1	0	-	1	0	7	1	0	-	8	1	3	1	0	-	5	19
% Single-Unit Trucks	2.9	33.3	4.3	-	-	4.3	0.0	-	2.3	-	-	2.0	0.0	2.2	2.9	0.0	-	2.0	3.4	0.7	0.9	0.0	-	0.9	1.7
Articulated Trucks	2	0	0	0	-	2	0	0	3	0	-	3	0	7	0	0	-	7	2	6	1	0	-	9	21
% Articulated Trucks	2.9	0.0	0.0	-	-	1.7	0.0	-	7.0	-	-	5.9	0.0	2.2	0.0	0.0	-	1.8	6.9	1.3	0.9	0.0	-	1.5	1.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	-	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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Count Name: Highway 140 & Netherby Road
Site Code: 230726
Start Date: 10/02/2024
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Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

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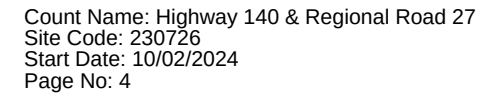
Count Name: Highway 140 & Regional Road 27
Site Code: 230726
Start Date: 10/02/2024
Page No: 1

Turning Movement Data

Start Time	Highway 140 Eastbound						Regional Road 27 Westbound						Highway 140 Northbound						Farr Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:00 AM	2	83	74	0	0	159	21	60	0	0	0	81	92	0	40	0	0	132	0	0	1	0	0	1	373
7:15 AM	1	120	90	0	0	211	26	87	2	0	1	115	108	0	50	0	0	158	1	2	2	0	1	5	489
7:30 AM	1	137	103	0	0	241	36	110	1	0	0	147	136	0	45	0	0	181	2	1	1	0	0	4	573
7:45 AM	0	112	126	0	0	238	38	107	0	0	0	145	138	2	48	0	0	188	0	1	6	0	0	7	578
Hourly Total	4	452	393	0	0	849	121	364	3	0	1	488	474	2	183	0	0	659	3	4	10	0	1	17	2013
8:00 AM	1	116	109	0	0	226	30	111	1	0	0	142	105	1	51	0	0	157	0	0	1	0	0	1	526
8:15 AM	2	135	92	0	0	229	33	119	0	0	1	152	135	0	35	0	0	170	0	2	2	0	0	4	555
8:30 AM	2	117	95	0	0	214	39	122	0	0	0	161	137	3	34	0	0	174	0	0	6	0	0	6	555
8:45 AM	4	74	82	0	0	160	26	103	0	0	0	129	114	0	32	0	0	146	0	0	7	0	0	7	442
Hourly Total	9	442	378	0	0	829	128	455	1	0	1	584	491	4	152	0	0	647	0	2	16	0	0	18	2078
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	7	78	83	0	0	168	20	73	1	0	0	94	71	0	18	0	0	89	0	2	3	0	0	5	356
11:15 AM	4	91	84	0	0	179	21	79	0	0	0	100	103	0	32	0	0	135	0	0	2	0	0	2	416
11:30 AM	2	89	90	1	0	182	28	69	0	0	0	97	92	1	41	0	0	134	1	0	0	0	0	1	414
11:45 AM	4	87	77	0	0	168	36	77	2	0	0	115	93	0	35	0	0	128	0	1	3	0	0	4	415
Hourly Total	17	345	334	1	0	697	105	298	3	0	0	406	359	1	126	0	0	486	1	3	8	0	0	12	1601
12:00 PM	2	66	95	0	0	163	33	102	0	0	1	135	98	3	26	0	0	127	0	1	3	0	0	4	429
12:15 PM	1	82	98	0	0	181	23	87	1	0	0	111	95	0	26	0	0	121	0	0	2	0	0	2	415
12:30 PM	1	89	94	0	0	184	19	94	1	0	0	114	91	0	31	0	0	122	0	1	3	0	0	4	424
12:45 PM	2	81	104	0	0	187	34	90	1	0	0	125	80	0	25	0	0	105	0	1	1	0	0	2	419
Hourly Total	6	318	391	0	0	715	109	373	3	0	1	485	364	3	108	0	0	475	0	3	9	0	0	12	1687
1:00 PM	0	77	93	0	0	170	28	65	0	0	0	93	72	0	25	0	0	97	0	0	1	1	0	2	362
1:15 PM	0	101	85	0	0	186	27	93	0	0	0	120	93	0	40	0	0	133	0	0	0	0	0	0	439
1:30 PM	1	78	90	0	0	169	27	90	1	0	0	118	82	0	36	0	0	118	1	0	0	0	0	1	406
1:45 PM	4	82	103	0	0	189	25	91	0	0	0	116	87	0	24	0	0	111	0	0	1	0	0	1	417
Hourly Total	5	338	371	0	0	714	107	339	1	0	0	447	334	0	125	0	0	459	1	0	2	1	0	4	1624
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	3	127	111	0	0	241	34	118	0	0	0	152	129	1	47	0	0	177	0	1	4	0	0	5	575
3:15 PM	7	83	123	0	0	213	41	119	3	0	0	163	133	0	55	0	0	188	0	1	4	0	0	5	569
3:30 PM	4	126	132	0	0	262	42	141	0	0	1	183	136	0	38	0	0	174	0	0	4	0	0	4	623
3:45 PM	5	95	126	0	0	226	30	159	0	0	1	189	130	1	42	0	0	173	1	0	6	0	0	7	595
Hourly Total	19	431	492	0	0	942	147	537	3	0	2	687	528	2	182	0	0	712	1	2	18	0	0	21	2362
4:00 PM	3	163	129	0	0	295	47	123	0	0	0	170	125	0	30	0	0	155	1	2	2	0	0	5	625
4:15 PM	2	145	138	0	0	285	53	179	1	0	0	233	133	1	47	0	0	181	0	0	4	0	0	4	703
4:30 PM	4	162	149	0	0	315	43	150	2	0	0	195	136	0	44	0	0	180	0	0	0	0	0	0	690

4:45 PM	3	130	126	0	0	259	38	161	0	0	0	199	112	2	44	0	0	158	0	1	4	0	0	5	621
Hourly Total	12	600	542	0	0	1154	181	613	3	0	0	797	506	3	165	0	0	674	1	3	10	0	0	14	2639
5:00 PM	2	133	123	0	0	258	57	160	1	0	0	218	103	0	39	0	0	142	0	1	8	0	0	9	627
5:15 PM	0	110	139	0	0	249	47	183	0	0	0	230	102	0	30	0	0	132	0	2	2	0	0	4	615
5:30 PM	0	89	129	1	0	219	29	122	0	0	0	151	116	1	39	0	0	156	0	0	2	0	0	2	528
5:45 PM	4	65	121	1	0	191	46	123	1	0	0	170	87	0	27	0	0	114	0	0	1	0	0	1	476
Hourly Total	6	397	512	2	0	917	179	588	2	0	0	769	408	1	135	0	0	544	0	3	13	0	0	16	2246
Grand Total	78	3323	3413	3	0	6817	1077	3567	19	0	5	4663	3464	16	1176	0	0	4656	7	20	86	1	1	114	16250
Approach %	1.1	48.7	50.1	0.0	-	-	23.1	76.5	0.4	0.0	-	-	74.4	0.3	25.3	0.0	-	-	6.1	17.5	75.4	0.9	-	-	-
Total %	0.5	20.4	21.0	0.0	-	42.0	6.6	22.0	0.1	0.0	-	28.7	21.3	0.1	7.2	0.0	-	28.7	0.0	0.1	0.5	0.0	-	0.7	-
Motorcycles	0	9	10	0	-	19	2	7	0	0	-	9	12	1	3	0	-	16	0	0	1	0	-	1	45
% Motorcycles	0.0	0.3	0.3	0.0	-	0.3	0.2	0.2	0.0	-	-	0.2	0.3	6.3	0.3	-	-	0.3	0.0	0.0	1.2	0.0	-	0.9	0.3
Cars & Light Goods	78	3163	3117	3	-	6361	896	3419	16	0	-	4331	3181	13	984	0	-	4178	7	19	82	1	-	109	14979
% Cars & Light Goods	100.0	95.2	91.3	100.0	-	93.3	83.2	95.9	84.2	-	-	92.9	91.8	81.3	83.7	-	-	89.7	100.0	95.0	95.3	100.0	-	95.6	92.2
Buses	0	55	31	0	-	86	8	60	1	0	-	69	32	1	4	0	-	37	0	0	2	0	-	2	194
% Buses	0.0	1.7	0.9	0.0	-	1.3	0.7	1.7	5.3	-	-	1.5	0.9	6.3	0.3	-	-	0.8	0.0	0.0	2.3	0.0	-	1.8	1.2
Single-Unit Trucks	0	84	140	0	-	224	70	62	1	0	-	133	136	0	71	0	-	207	0	1	1	0	-	2	566
% Single-Unit Trucks	0.0	2.5	4.1	0.0	-	3.3	6.5	1.7	5.3	-	-	2.9	3.9	0.0	6.0	-	-	4.4	0.0	5.0	1.2	0.0	-	1.8	3.5
Articulated Trucks	0	12	115	0	-	127	101	19	0	0	-	120	103	0	113	0	-	216	0	0	0	0	-	0	463
% Articulated Trucks	0.0	0.4	3.4	0.0	-	1.9	9.4	0.5	0.0	-	-	2.6	3.0	0.0	9.6	-	-	4.6	0.0	0.0	0.0	0.0	-	0.0	2.8
Bicycles on Road	0	0	0	0	-	0	0	0	1	0	-	1	0	1	1	0	-	2	0	0	0	0	-	0	3
% Bicycles on Road	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	5.3	-	-	0.0	0.0	6.3	0.1	-	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	60.0	-	-	-	-	-	-	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	40.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

Turning Movement Data Plot



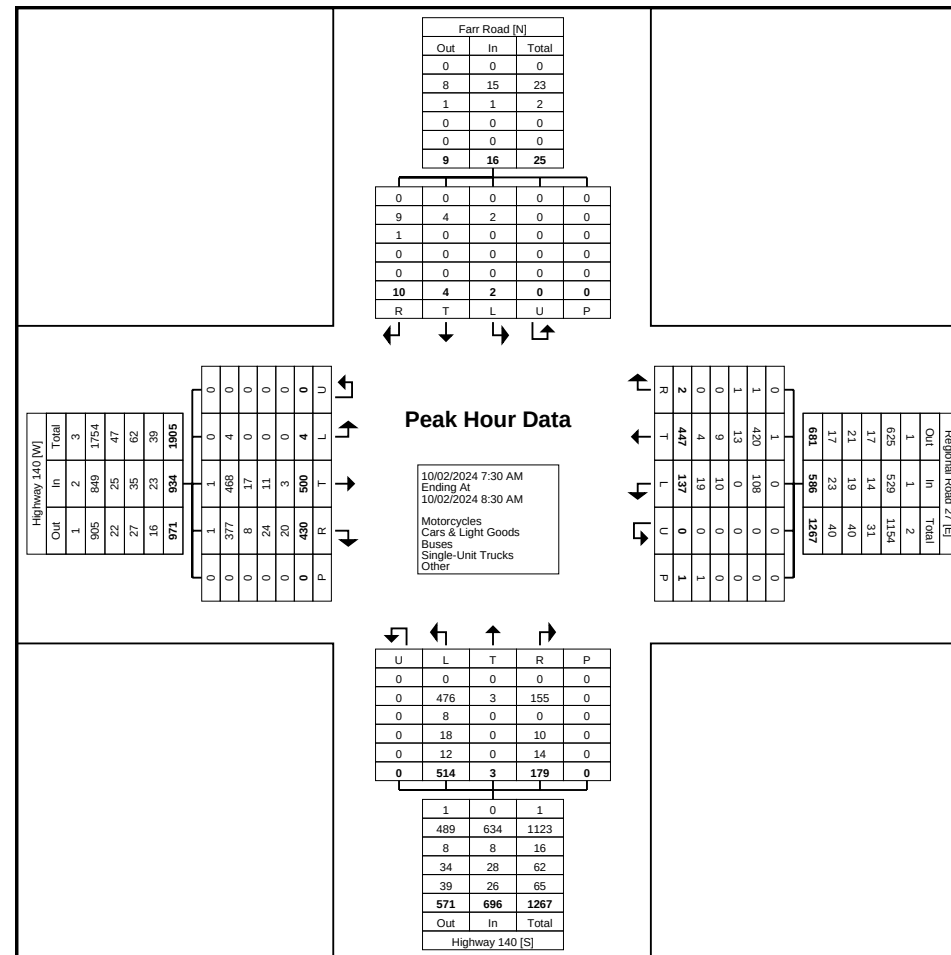
Start Time	Highway 140 Eastbound						Regional Road 27 Westbound						Highway 140 Northbound						Farr Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
7:30 AM	1	137	103	0	0	241	36	110	1	0	0	147	136	0	45	0	0	181	2	1	1	0	0	4	573
7:45 AM	0	112	126	0	0	238	38	107	0	0	0	145	138	2	48	0	0	188	0	1	6	0	0	7	578
8:00 AM	1	116	109	0	0	226	30	111	1	0	0	142	105	1	51	0	0	157	0	0	1	0	0	1	526
8:15 AM	2	135	92	0	0	229	33	119	0	0	1	152	135	0	35	0	0	170	0	2	2	0	0	4	555
Total	4	500	430	0	0	934	137	447	2	0	1	586	514	3	179	0	0	696	2	4	10	0	0	16	2232
Approach %	0.4	53.5	46.0	0.0	-	-	23.4	76.3	0.3	0.0	-	-	73.9	0.4	25.7	0.0	-	-	12.5	25.0	62.5	0.0	-	-	-
Total %	0.2	22.4	19.3	0.0	-	41.8	6.1	20.0	0.1	0.0	-	26.3	23.0	0.1	8.0	0.0	-	31.2	0.1	0.2	0.4	0.0	-	0.7	-
PHF	0.500	0.912	0.853	0.000	-	0.969	0.901	0.939	0.500	0.000	-	0.964	0.931	0.375	0.877	0.000	-	0.926	0.250	0.500	0.417	0.000	-	0.571	0.965
Motorcycles	0	1	1	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	3
% Motorcycles	0.0	0.2	0.2	-	-	0.2	0.0	0.2	0.0	-	-	0.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.1
Cars & Light Goods	4	468	377	0	-	849	108	420	1	0	-	529	476	3	155	0	-	634	2	4	9	0	-	15	2027
% Cars & Light Goods	100.0	93.6	87.7	-	-	90.9	78.8	94.0	50.0	-	-	90.3	92.6	100.0	86.6	-	-	91.1	100.0	100.0	90.0	-	-	93.8	90.8
Buses	0	17	8	0	-	25	0	13	1	0	-	14	8	0	0	0	-	8	0	0	1	0	-	1	48
% Buses	0.0	3.4	1.9	-	-	2.7	0.0	2.9	50.0	-	-	2.4	1.6	0.0	0.0	-	-	1.1	0.0	0.0	10.0	-	-	6.3	2.2
Single-Unit Trucks	0	11	24	0	-	35	10	9	0	0	-	19	18	0	10	0	-	28	0	0	0	0	-	0	82
% Single-Unit Trucks	0.0	2.2	5.6	-	-	3.7	7.3	2.0	0.0	-	-	3.2	3.5	0.0	5.6	-	-	4.0	0.0	0.0	0.0	-	-	0.0	3.7
Articulated Trucks	0	3	20	0	-	23	19	4	0	0	-	23	12	0	14	0	-	26	0	0	0	0	-	0	72
% Articulated Trucks	0.0	0.6	4.7	-	-	2.5	13.9	0.9	0.0	-	-	3.9	2.3	0.0	7.8	-	-	3.7	0.0	0.0	0.0	-	-	0.0	3.2
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-



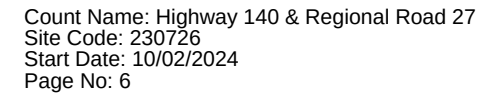
Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@pts1.com

Count Name: Highway 140 & Regional Road 27
Site Code: 230726
Start Date: 10/02/2024
Page No: 5



Turning Movement Peak Hour Data Plot (7:30 AM)



Start Time	Highway 140 Eastbound						Regional Road 27 Westbound						Highway 140 Northbound						Farr Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
12:00 PM	2	66	95	0	0	163	33	102	0	0	1	135	98	3	26	0	0	127	0	1	3	0	0	4	429
12:15 PM	1	82	98	0	0	181	23	87	1	0	0	111	95	0	26	0	0	121	0	0	2	0	0	2	415
12:30 PM	1	89	94	0	0	184	19	94	1	0	0	114	91	0	31	0	0	122	0	1	3	0	0	4	424
12:45 PM	2	81	104	0	0	187	34	90	1	0	0	125	80	0	25	0	0	105	0	1	1	0	0	2	419
Total	6	318	391	0	0	715	109	373	3	0	1	485	364	3	108	0	0	475	0	3	9	0	0	12	1687
Approach %	0.8	44.5	54.7	0.0	-	-	22.5	76.9	0.6	0.0	-	-	76.6	0.6	22.7	0.0	-	-	0.0	25.0	75.0	0.0	-	-	-
Total %	0.4	18.9	23.2	0.0	-	42.4	6.5	22.1	0.2	0.0	-	28.7	21.6	0.2	6.4	0.0	-	28.2	0.0	0.2	0.5	0.0	-	0.7	-
PHF	0.750	0.893	0.940	0.000	-	0.956	0.801	0.914	0.750	0.000	-	0.898	0.929	0.250	0.871	0.000	-	0.935	0.000	0.750	0.750	0.000	-	0.750	0.983
Motorcycles	0	0	1	0	-	1	1	1	0	0	-	2	0	1	0	0	-	1	0	0	0	0	-	0	4
% Motorcycles	0.0	0.0	0.3	-	-	0.1	0.9	0.3	0.0	-	-	0.4	0.0	33.3	0.0	-	-	0.2	-	0.0	0.0	-	-	0.0	0.2
Cars & Light Goods	6	302	335	0	-	643	79	356	2	0	-	437	329	2	76	0	-	407	0	2	9	0	-	11	1498
% Cars & Light Goods	100.0	95.0	85.7	-	-	89.9	72.5	95.4	66.7	-	-	90.1	90.4	66.7	70.4	-	-	85.7	-	66.7	100.0	-	-	91.7	88.8
Buses	0	3	4	0	-	7	0	2	0	0	-	2	1	0	0	0	-	1	0	0	0	0	-	0	10
% Buses	0.0	0.9	1.0	-	-	1.0	0.0	0.5	0.0	-	-	0.4	0.3	0.0	0.0	-	-	0.2	-	0.0	0.0	-	-	0.0	0.6
Single-Unit Trucks	0	12	25	0	-	37	12	9	1	0	-	22	21	0	13	0	-	34	0	1	0	0	-	1	94
% Single-Unit Trucks	0.0	3.8	6.4	-	-	5.2	11.0	2.4	33.3	-	-	4.5	5.8	0.0	12.0	-	-	7.2	-	33.3	0.0	-	-	8.3	5.6
Articulated Trucks	0	1	26	0	-	27	17	5	0	0	-	22	13	0	19	0	-	32	0	0	0	0	-	0	81
% Articulated Trucks	0.0	0.3	6.6	-	-	3.8	15.6	1.3	0.0	-	-	4.5	3.6	0.0	17.6	-	-	6.7	-	0.0	0.0	-	-	0.0	4.8
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Turning Movement Peak Hour Data Plot (12:00 PM)

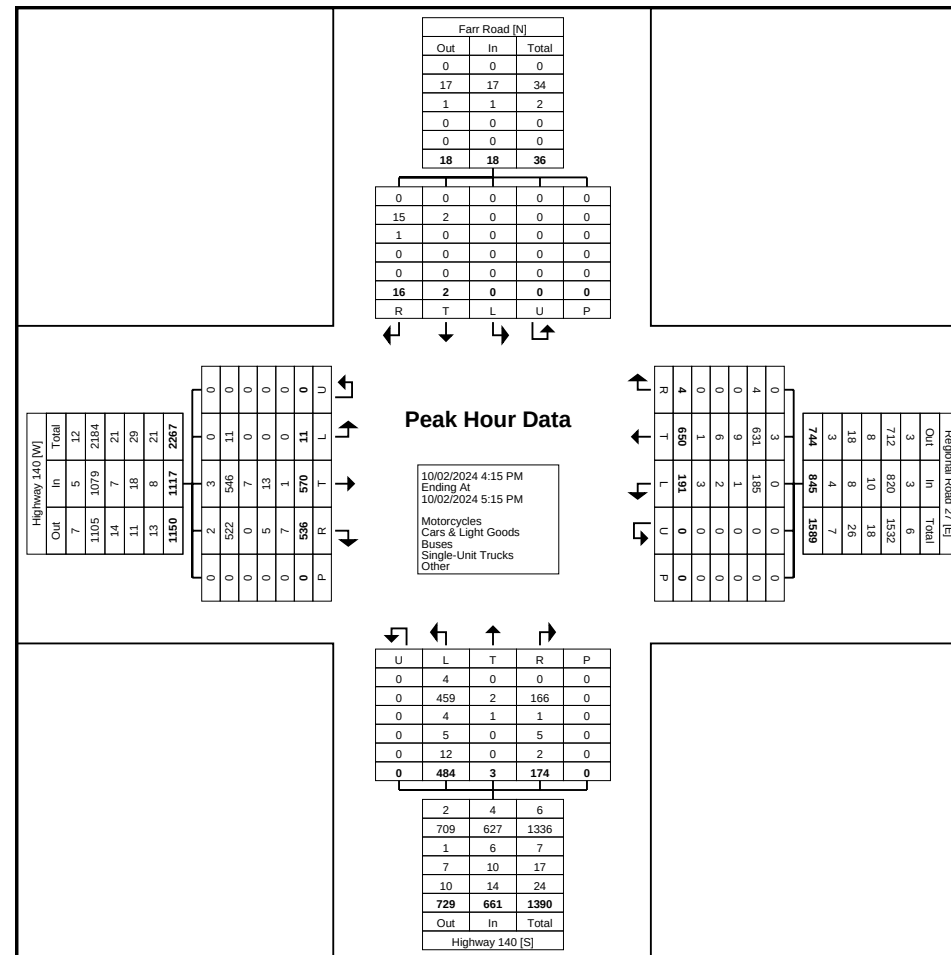
Start Time	Highway 140 Eastbound						Regional Road 27 Westbound						Highway 140 Northbound						Farr Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
4:15 PM	2	145	138	0	0	285	53	179	1	0	0	233	133	1	47	0	0	181	0	0	4	0	0	4	703
4:30 PM	4	162	149	0	0	315	43	150	2	0	0	195	136	0	44	0	0	180	0	0	0	0	0	0	690
4:45 PM	3	130	126	0	0	259	38	161	0	0	0	199	112	2	44	0	0	158	0	1	4	0	0	5	621
5:00 PM	2	133	123	0	0	258	57	160	1	0	0	218	103	0	39	0	0	142	0	1	8	0	0	9	627
Total	11	570	536	0	0	1117	191	650	4	0	0	845	484	3	174	0	0	661	0	2	16	0	0	18	2641
Approach %	1.0	51.0	48.0	0.0	-	-	22.6	76.9	0.5	0.0	-	-	73.2	0.5	26.3	0.0	-	-	0.0	11.1	88.9	0.0	-	-	-
Total %	0.4	21.6	20.3	0.0	-	42.3	7.2	24.6	0.2	0.0	-	32.0	18.3	0.1	6.6	0.0	-	25.0	0.0	0.1	0.6	0.0	-	0.7	-
PHF	0.688	0.880	0.899	0.000	-	0.887	0.838	0.908	0.500	0.000	-	0.907	0.890	0.375	0.926	0.000	-	0.913	0.000	0.500	0.500	0.000	-	0.500	0.939
Motorcycles	0	3	2	0	-	5	0	3	0	0	-	3	4	0	0	0	-	4	0	0	0	0	-	0	12
% Motorcycles	0.0	0.5	0.4	-	-	0.4	0.0	0.5	0.0	-	-	0.4	0.8	0.0	0.0	-	-	0.6	-	0.0	0.0	-	-	0.0	0.5
Cars & Light Goods	11	546	522	0	-	1079	185	631	4	0	-	820	459	2	166	0	-	627	0	2	15	0	-	17	2543
% Cars & Light Goods	100.0	95.8	97.4	-	-	96.6	96.9	97.1	100.0	-	-	97.0	94.8	66.7	95.4	-	-	94.9	-	100.0	93.8	-	-	94.4	96.3
Buses	0	7	0	0	-	7	1	9	0	0	-	10	4	1	1	0	-	6	0	0	1	0	-	1	24
% Buses	0.0	1.2	0.0	-	-	0.6	0.5	1.4	0.0	-	-	1.2	0.8	33.3	0.6	-	-	0.9	-	0.0	6.3	-	-	5.6	0.9
Single-Unit Trucks	0	13	5	0	-	18	2	6	0	0	-	8	5	0	5	0	-	10	0	0	0	0	-	0	36
% Single-Unit Trucks	0.0	2.3	0.9	-	-	1.6	1.0	0.9	0.0	-	-	0.9	1.0	0.0	2.9	-	-	1.5	-	0.0	0.0	-	-	0.0	1.4
Articulated Trucks	0	1	7	0	-	8	3	1	0	0	-	4	12	0	2	0	-	14	0	0	0	0	-	0	26
% Articulated Trucks	0.0	0.2	1.3	-	-	0.7	1.6	0.2	0.0	-	-	0.5	2.5	0.0	1.1	-	-	2.1	-	0.0	0.0	-	-	0.0	1.0
Bicycles on Road	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	0
% Bicycles on Road	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	-	0.0	0.0	-	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-
% Bicycles on Crosswalk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Paradigm Transportation Solutions Limited
5A-150 Pinebush Rd

Cambridge, Ontario, Canada N1R 8J8
519-896-3163 cbowness@ptsI.com

Count Name: Highway 140 & Regional Road 27
Site Code: 230726
Start Date: 10/02/2024
Page No: 9



Turning Movement Peak Hour Data Plot (4:15 PM)

Appendix B1

2012 Access Review





Transportation
Planning

Transit
Planning

Traffic
Engineering

Parking
Planning

Philip E. Grubb

B.A.Sc., P.Eng.
President

James J.L. Mallett

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905-381-2229
Fax: 1-866-722-5117

November 7, 2012

Mr. Cecil E. Vincent
Manager of Special Projects & Corporate Strategic Initiatives
City of Port Colborne
66 Charlotte Street, Port Colborne, ON
L3K 3C8

**Re: Nyon Oil Energy Farm Access Options and
Recommendations**

Further to your request this letter is intended to provide justification for the recommended Highway 140 access concept for the proposed Energy Farm and adjacent lands subsequent to our meeting with the Ministry of Transportation (MTO).

Highway 140 is designated as a Class 3 highway meaning that it has special access control and direct property access is not permitted by MTO as was initially requested for the development. The MTO is also concerned about the number of private/public road intersections on this roadway, which was considered in our review.

As the development is located in the north part of the Port Colborne Industrial Park Lands, the following access options to Highway 140 have been considered:

1. Access Via Forks Road
2. Access Via Kleinsmith Road
3. Access via a new connection north of Kleinsmith Road.



ACCESS VIA FORKS ROAD (NOT RECOMMENDED)

There are a number of concerns related to the option of providing access via Forks Road. These are as follows:

1. Rural residents on Forks Road will be impacted by large tanker truck traffic passing by homes.
2. To minimize this impact, a new 1.5 km internal road would be required to connect Forks Road to the Tank Farm at significant cost. It would need to cross a municipal drain and associated flood plain adding to natural environment impacts.
3. The Forks Road access would still impact existing residents with the new roadway as there are a number of residential properties with frontage to Forks Road. Figure 1 illustrates the residential properties that would be affected.
4. The internal road would need to cross a railway spur line and the City of Port Colborne Rail Line to service the development; additional safety considerations would be required impacting the cost and timing of development.
5. Building an internal road to Forks Road increases the amount of impervious surfaces increasing the impact on the environment.
6. Increases in energy consumption and emissions associated with truck movements that are required to travel south on Forks Road to then travel north along Highway 140.
7. Heavily loaded trucks exiting the site would impact Highway 140 traffic due to slow acceleration and speed in negotiating the grades associated with northward movement over the rail overpass.
8. Safety concerns related to trucks turning to go northward impeding traffic southbound over the rail over pass due to reduced sight distance.
9. The associated need and significant cost to improve the geometrics of Forks Road and bring it up to industrial standards by eliminating the sub-standard curvature causing associated natural environment and social impacts (i.e. property impacts).

In summary there are a number of significant and unnecessary costs, social and environmental impacts with this option, to service a development, that will bring economic benefit to the City and the Niagara Region, which can be avoided with providing an access from Highway 140.



FIGURE 1: RESIDENTS IMPACTED AND POOR GEOMETRY WITH THE FORKS ROAD ACCESS



ACCESS VIA KLEINSMITH ROAD (NOT RECOMMENDED)

Kleinsmith Road is an existing municipal road located about 950 m north of the intersection of Forks Road and Highway 140. It currently intersects with Highway 140 essentially serving as a driveway to an adjacent residential dwelling. It extends north and south parallel to Highway 140 presumably to provide access to future development of the adjacent designated industrial land.

The use of this access to serve the Energy Park has a number of issues related to it as follows:

1. The existing resident of the immediate surrounding area would be impacted by large tanker truck traffic passing by their home.
2. The existing Kleinsmith Road would need to be upgraded along with its intersection at Highway 140 or, alternatively, a new road would be required adjacent to Kleinsmith and Highway 140 to connect to the east-west portion of Kleinsmith to provide access to the tank farm.



3. Sight distance at the intersection is very poor due to the intersection being located immediately north of the railway overpass. This is a safety issue for both truck users as well as residents currently utilizing the roadway that cannot be feasibly mitigated. A costly re-alignment of Highway 140 would need to occur to improve the overall sight distance issues. Figure 2 illustrates the sight distance issues with the Kleinsmith Road Access.
4. Heavily loaded trucks exiting the site to go south would have greater impacts on Highway 140 traffic due to slow acceleration and speed in negotiating the grades associated with southbound movement over the rail overpass.
5. Safety concerns related to trucks turning to go northward impeding traffic northbound over the rail over pass due to restricted sight distance.
6. Increases in energy consumption and emissions associated with truck movements that are required to travel south to head north.

In summary, the sight distance, safety, cost and social impacts of this access alternative is not recommended.

FIGURE 2: SIGHT DISTANCE ISSUES WITH THE KLEINSMITH ROAD ACCESS





ACCESS VIA A NEW MUNICIPAL ROAD NORTH OF KLEINSMITH ROAD (RECOMMENDED)

The MTO will not permit a private driveway entrance to the tank farm as was requested in the development application. However, they are willing to permit a new public road access to Highway 140 provided that there is no increase in the total number of intersections on the highway. This would require closure of one intersection to create the new public road intersection. The intersection of Kleinsmith Road which has more limited use than that of Forks Road and has safety issues associated with it due to sight lines would be the most desirable access to eliminate. As such, Kleinsmith Road would no longer have direct access to Highway 140 and the existing resident off of Kleinsmith Road would need to drive north to the new access on the existing or upgraded local road.

The recommended access concept is shown in Figure 3, it is noted that the proposed roadway location and layout is conceptual and is dependent on future development to justify the need and for site plan applications to determine specific locations and requirements.

The intersection would be located immediately north of the designated residential lands about 400m north of Kleinsmith Road. From that point, a collector road would be constructed west and south to Forks Road, opposite Snider Road. This private industrial road would service all of the industrial lands north of Forks Road with driveway access or intersecting condominium roads. The Kleinsmith Road resident would be served by a municipal road or driveway connection to the new collector road and its intersection with Highway 140. Until additional industrial development proceeds to the south to require the full industrial road, the interim construction would involve the required geometrics to create the intersection on Highway 140 and extension of the road to beyond the Kleinsmith Road and tank farm driveway.

The advantages of this concept are as follows:

1. The intersection location has excellent sight lines and no significant grades creating a safer access to that of Kleinsmith Road. Figure 4 illustrates the sight lines north and south of the proposed new intersection to Highway 140.
2. The proposed collector road intersection will serve activities associated with the energy farm, future development and existing residential dwellings.
3. Truck loading/unloading, railway operations and associated office space will be located near the access making more efficient use of the development area.
4. Kleinsmith Road will be closed as a public road in exchange for the new access as it currently has restricted sight lines due to its proximity to the overpass.
5. The new access could co-ordinate with lands to the east if the need arises.
6. Most of the tanker trucks would travel north eliminating the need to use the rail overpass and mitigating associated impacts on highway traffic.
7. There is little or no social or natural environment impact.
8. The initial construction cost is much less than with the other options to allow start-up of the energy park to occur in a timely manner.
9. Direct access to Highway 140 does not require trucks to travel out of their way to/from northerly destinations.

The required geometrics at the proposed intersection will be determined through an updated traffic impact study.



FIGURE 3: PROPOSED NEW PUBLIC ROAD ACCESS AND CONCEPTUAL COLLECTOR ROAD

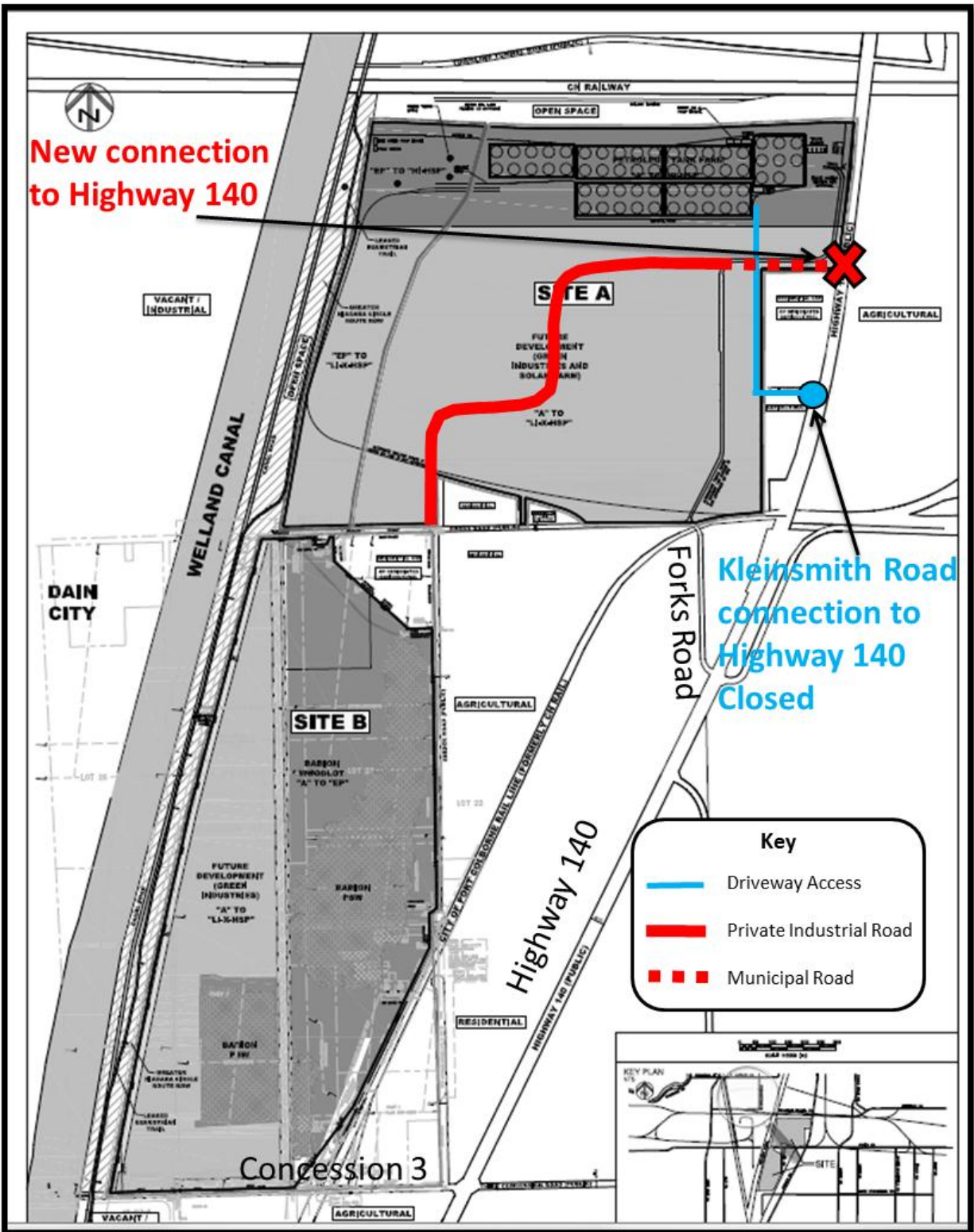




FIGURE 4: SIGHTLINES AT PROPOSED HIGHWAY 140 INTERSECTION





SUMMARY

A proposed new access to Highway 140 north of Kleinsmith Road is beneficial overall to the proposed Energy Park as well as residents located within the area. Access provided to Forks Road would impact existing residents along Forks Road through additional truck traffic as well as increased delays at the intersection of Forks Road and Highway 140. It is also noted that costly improvements would have to be made to improve the geometrics of Forks Road.

It is also noted that the current intersection of Highway 140 and Kleinsmith Road has very poor sight distance to the south due to the rail overpass. By closing this connection and providing a new access to Highway 140 with connections to the Energy Park, as well as the single resident located off of Kleinsmith Road, sight distance issues to the south are no longer a concern.

Based on the MTO advising that they are willing to permit a new municipal road access to Highway 140 provided that there is no increase in the total number of intersections on the highway, the closure of Kleinsmith Road would provide overall advantages, primary safety concerns as well as limited disruption (i.e. additional truck traffic) on existing roadways.

We trust this report will meet your requirements.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED

Philip E. Grubb

P.Eng.
President

Appendix B2

City of Port Colborne Letter to MTO





CITY OF PORT COLBORNE

Municipal Offices
66 Charlotte Street
Port Colborne, Ontario
L3K 3C8
www.portcolborne.ca

SPECIAL PROJECTS AND STRATEGIC INITIATIVES

December 18, 2014

Alexandre Gitkow
Permits Officer, Central Region
Corridor Management Section

Dear Mr Gitkow,

Re: Proposed closure of Kleinsmith Road access to Highway 140, Port Colborne

I have been requested to provide to you the current status of the City of Port Colborne's approval of the proposed closure of Kleinsmith Road access to Highway 140. City Council on December 10, 2012 approved the following direction to staff regarding the proposed Energy park development and this has been communicated to the proponent Nyon Oil Inc.

"Department of Chief Administrative Officer, Special Projects & Corporate Strategic Initiatives, Report No. 2012-9, Subject: Request from Nyon Oil Inc. for the City of Port Colborne to consider approval of a new access from Highway 140 to the proposed Energy Park Lands including the closure of the existing Kleinsmith Road entrance and replacement with the new access."

Council resolved:

That based upon the following terms City Council supports the request from Nyon Oil Inc. for a new access from the Port Colborne Energy Park as described in the November 22, 2012 correspondence from Nyon Oil Inc.; and

That no action regarding the changes in access be commenced other than obtaining Regional and Provincial approvals in principle until after the current Ontario Municipal Board hearings have been completed; and further

That the terms listed below form a prerequisite for final Council approval of the proposed new access described above:

- a. All costs associated with the closure of the existing Kleinsmith Road access to Highway 140 as proposed in the Nyon Oil Inc. letter and attached map showing the proposed configuration of same be at the sole cost of Nyon Oil Inc.

- b. No actual work be started until this arrangement has been confirmed in an appropriate legal agreement to reflect same to the City of Port Colborne's satisfaction.
- c. That Nyon Oil Inc. meet with the affected residents and identify any issues that require mitigation and to provide a list of same to the City along with their proposed mitigations of same. Council while not agreeing to mitigate these may have to judge the appropriateness of both the issues and the proposed mitigation to decide a final response to this request.
- d. That Nyon Oil Inc. obtain approvals from all Provincial, Regional and City of Port Colborne technical and legal authorities for the proposed changes before any work to implement same is commenced and that this will be at the full expense of Nyon Oil Inc.
- e. Legal Title without conditions for the proposed new municipal access and connection to the existing Kleinsmith properties will be transferred to the City as a part of any permit process to begin construction of the proposed new access.
- f. No work will be started without an approved schedule of start and finish approved by the City of Port Colborne and an identification of what mitigation measures will be implemented to ensure the existing resident of Kleinsmith road is not denied ongoing access to that residence.
- g. As a part of approval process noted in (d) the City reserves the right as a part of its approval to require a contribution to ongoing maintenance of the proposed new municipal access for wear expected from the heavy vehicle traffic access and leaving the Energy Park Project.
- h. The proposed internal servicing network will be a private road network until and unless the proponent and the City of Port Colborne negotiate a different ownership arrangement at a future date.
- i. Zoning and Official Plan be regularized for the two private properties (if required) based on the changes in road access, frontage etc. all at the expense of Nyon Oil Inc.
- j. As part of approval process noted in (c), that staff be directed to attend the meetings between Nyon Oil Inc. and affected residents and communicate directly with the landowners on matters pertaining to Kleinsmith Road."

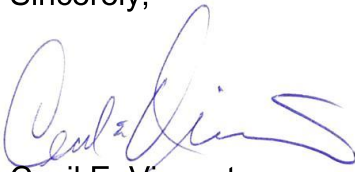
December 19, 2014
To: Alexandre Gitkow
Re: Proposed closure of Kleinsmith Road
access to Highway 140, Port Colborne

Page 3 of 3

The City, subject to those terms being met to its satisfaction, would complete the necessary legal procedures to approve the closure. I would note that the Ontario Municipal Board hearings have been concluded and the proposed Zoning and OP changes approved by the board and the new City's OP reflects those changes.

I trust that this is the information that you have requested. Please contact me if I can be of any additional assistance.

Sincerely;



Cecil E. Vincent
Manager of Special Projects and Strategic Initiatives
City of Port Colborne

CC:

- Gordon R. Baker, Q.C.
- Kristy Shortall, MCIP, RPP, LEED Green Associate, Senior Planner/Project Manager
Planning & Environmental Design Associate, MMM Group Limited
- Phil Grubb, B.A.Sc., P.Eng., President, Paradigm Transportation Solutions Limited

Appendix B3

MTO Acceptance of Kleinsmith Road Closure



Adam Makarewicz

Subject: FW: Proposed closure process for Kleinsmith Road
Attachments: Proposed closure of Kleinsmith Dec 19 2014.pdf; 10D201-B.PDF

From: Gitkow, Alexandre (MTO) [<mailto:Alexandre.Gitkow@ontario.ca>]
Sent: January-13-14 2:24 PM
To: 'Phil Grubb'
Cc: Gordon R. Baker Q.C.; Kristy Shortall; robertheil@portcolborne.ca; 'cecilvincent@portcolborne.ca'
Subject: RE: Proposed closure process for Kleinsmith Road

Dear Mr. Grubb,

In principle, the MTO is OK with the proposed new access and closure of Kleinsmith Road. The following are comments from our highway engineering office and traffic office with regard to the letter from Port Colborne dated December 18, 2013 (attach), the site plan (also attach) and the future information that we will require:

- MTO will require a council resolution from Port Colborne, showing that they will open the new road and assume it.
- New access to be constructed/inspected and opened prior to old access being closed.
- Road entrance to be constructed to OPSD standards.
- Sight triangles to be conveyed by deed to MTO, also require a reference plan. This will be to be done prior to issuing an encroachment permit & Land-Use permit
- MTO will need to undertake an OIC in order to lift the designation at the old intersection. And put a designation down where the new access.
- Home owners to be notified by site developer in writing when new road will be opened and old road will be closed. Copy of the letter shall be submitted to MTO
- MTO will require a copy of a Road Closing By-Law
- Developer to provide cost estimate for all works on MTO property, cost to also include Traffic control.
- Ensure the new Access Road and intersection is constructed and signed off by both the ministry and the City before the old road is closed and removed.
- There is a requirement to post regulatory signs on the old road with a set date of closure by the City (G725(English), G725F(French) each sign is 600x900)

Permanent signing:

Upon completion of the new Access Road and closure of old Kleinsmith Road, the following are required:

- Removal of existing and replacement with new intersection ahead warning signs (Wa-13aL, stub on left 75x75), (Wa-13aR 75x75, stub on right)
- Removal of existing and replacement with new Advance and Turn-off guide signs (4 signs total, 2 per direction)
- Addition of a Through Traffic Keep Right" sign for NB Hwy. 140 in advance of the new NB left turn lane into the new Access Road. (Rb-27B 120x210)
- A new Wa-8LR (Checkerboard Sign 120x120) is required on the east side of Hwy. 140 facing the new Access Road.

- A new Road ID sign to be placed to the left of the Wa-8LR. This sign to have North/Nord above a Left arrow, a Crown with 140 in it and South/Sud and a right arrow beneath it. The sign is a G202B and is 90x240 in size.
- IF signals are not being initially installed, a Stop Sign will be required for the new access road Ra-1 (120x120).
- The new Access Road / Kleinsmith Road needs speed limit signs. (city to supply)
- Pending a site review, the addition of a Hwy. 140 North/Nord, or South/Sud route marker may be required.
- Pending a site review, the addition of 80km/h speed limit signs may be required on Hwy. 140
- A Permanent Signing Plan is required for MTO review prior to completion of a Sign order form for the MTO Sign Shop.

Temporary Signing:

- OTM Book 7 signing
- TC-64 signing for lane closures / etc.
- Construction staging plans required for MTO review.

Pavement marking:

- Pavement marking plan required for MTO review.

Illumination:

- If this intersection will be illuminated fully or partially, an illumination plan is required for MTO review.
- All light poles to conform to MTO safe pole policy – this applies to the height of the concrete pole bases as well.

Highway Engineering:

- What is the intersection / road design for the new Access Road at Hwy 140? Lane configuration details are missing.
- What is the new design for Kleinsmith Road after being closed? Cul-de-sac? 'T' intersection?
- All the facility needs to be outside of the setback limits (14m setback from property line)
- Needs to submit drainage assessment
- MTO will require you to submit a traffic construction staging plan for the road closure and new road construction
- MTO will need to see a more complete set of drawing including but not limited to roadway / intersection design, cross section / typical, drainage, electrical, fire route, etc
- MTO will require a lighting plan and signage plans

Please do not hesitate to contact me should you require more information.

Sincerely Yours,

Alexandre Gitkow

Corridor Management Officer, Central Region
 Corridor Management Section
 Tel: (416) 235-4387
 Fax: (416)-235-4267
alexandre.gitkow@ontario.ca

Appendix B4

City of Port Colborne Road Agreement



ROAD AGREEMENT

THIS AGREEMENT made as of the 30th day of April, 2015

BETWEEN:

**NYON OIL INC. and
NYON MARINE FUELLING CORPORATION**

(hereinafter collectively referred to as "Nyon")

OF THE FIRST PART

- and -

THE CORPORATION OF THE CITY OF PORT COLBORNE

(hereinafter referred to as the "City")

OF THE SECOND PART

WHEREAS:

- A. The existing location of Kleinsmith Road in the City of Port Colborne, including its existing access to Highway 140 (the "**Existing Highway 140 Access**") is shown on the 'Potential Phasing Plan' dated March 2015 attached hereto as Schedule "A" (the "**Concept Plan**"); the travelled portion of Kleinsmith Road being Parts 54, 55, 56 and 57 on Reference Plan 59R-15312 and the untravelled portion being Part 1 on Reference Plan 59R-15314.
- B. In connection with its proposed development of an energy park on the lands described in Schedule "B" attached hereto in the City of Port Colborne (the "**Energy Park Lands**") and to provide access to the Energy Park Lands, Nyon wishes to extend Kleinsmith Road north from the existing travelled portion of Kleinsmith Road as shown on the Concept Plan, in order to replace the Existing Highway 140 Access with access further north on Highway 140 (the "**New Highway 140 Access**") as shown on the Concept Plan; it being acknowledged that the approval conditions of the City and of the Ministry of Transportation of Ontario ("**MTO**") will have to be complied with, including without limitation the following:
 - (a) the requirement of the City:
 - (i) that the existing travelled portion of Kleinsmith Road shown on the Concept Plan be improved and upgraded from a gravel road to the standards required for a rural residential, two lane paved roadway;
 - (ii) that the untravelled portion of Kleinsmith Road be widened (by conveyance from Nyon to the City for \$1.00) to include Parts 28, 29 and 30 on Reference Plan 59R-15312

and that a road be constructed on the untravelled portion of Kleinsmith Road as so widened and as shown on the Concept Plan; the portion of such road south of Part 28 on Reference Plan 59R-15312 to be constructed to the standards required for a rural residential, two lane paved roadway and the remaining portion of such road to be constructed to the standards required for use by heavy trucks required by the current applicable standards of the City as may be amended in the future prior to construction and of general application within the City of Port Colborne (said current standards being attached hereto as Schedule "B"); and

(iii) that Kleinsmith Road be extended (by conveyance from Nyon to the City for \$1.00) to include the lands designated as Parts 17 and 18 on Reference Plan 59R-15312 (these lands together with Parts 28, 29 and 30 on Reference Plan 59R-15312 being collectively called the "**New Municipal Access Road Lands**") and that a road of the standards required for use by heavy trucks as specified in clause (ii) above be constructed thereon (the road to be constructed to said standards (as applicable) required for a rural residential, two lane paved roadway and for use by heavy trucks as provided in clauses (i), (ii) and (iii) being called the "**New Municipal Access Road**"); and

(b) the requirement that the Existing Highway 140 Access must be closed in accordance with the City's highway closing procedures and all other applicable requirements including any requirements of MTO before the New Highway 140 Access is approved.

- C. In order to close the Existing Highway 140 Access, Nyon has applied to the City to close the portion of Kleinsmith Road shown as Parts 55 and 56 on Reference Plan 59R-15312 using a hammerhead termination (as shown on the Concept Plan) for the travelled roadway itself at the west limit of Parts 55 and 56 on Reference Plan 59R-15312 and to open the New Municipal Access Road.
- D. The parties have agreed to enter into this Agreement in order to confirm certain matters as specified in this Agreement with respect to the aforesaid proposed relocation of the access from Kleinsmith Road to Highway 140.

NOW THEREFORE THIS AGREEMENT WITNESSETH that in consideration of the mutual covenants and agreements hereinafter set forth, and for other good and valuable consideration and the sum of Ten Dollars (\$10.00) of lawful money now paid by each of the parties to the other (the receipt and sufficiency of which is hereby expressly acknowledged), the parties hereby confirm that the above recitals are true and correct and hereby covenant and agree to and with each other as follows:

CONSTRUCTION AND COSTS

1. Nyon is responsible at its sole cost for the design and construction of (i) the closure of the Existing Highway 140 Access, (ii) the opening of the New Highway 140 Access, (iii) the New Municipal Access Road, and (iv) the changes, improvements and upgrades to the existing Kleinsmith Road and all matters ancillary to any of the foregoing including without limitation all design, engineering, planning and construction costs associated with any of the foregoing. Without limiting the generality of the foregoing:

- (a) Nyon agrees to contribute and transfer the New Municipal Access Road Lands to the City for \$1.00; and, if and when Nyon has fulfilled its obligations under this Agreement (save and except the continuing obligation pursuant to clause (f) hereof) and MTO has consented to the closure of the Existing Highway 140 Access, if required, and its replacement with the New Highway 140 Access, the City agrees to open the New Municipal Access Road and shall immediately assume the New Municipal Access Road in accordance with its road assumption bylaws, policies and procedures;
- (b) Nyon is responsible, at its cost, for the construction of the New Municipal Access Road from Highway 140, the portion of such road south of Part 28 on Reference Plan 59R-15312 to be constructed to the standards required for a rural residential, two lane paved roadway and the remaining portion of such road to be constructed to the standards required for use by heavy trucks required by the current applicable standards of the City as may be amended in the future prior to construction and of general application within the City of Port Colborne (said current standards being attached hereto as Schedule "B");
- (c) Nyon is responsible, at its cost, for the construction of any improvements required by the MTO;
- (d) Nyon is responsible, at its cost, to close the Existing Highway 140 Access and to construct the road in accordance with MTO standards as outlined in a letter from the MTO dated January 13, 2014 attached as Schedule "C" (the "**MTO Letter**") or as may be amended in the future prior to construction.
- (e) Nyon is responsible, at its cost, for improving and upgrading the existing Kleinsmith Road from a gravel road to the standards required for a rural residential, two lane roadway with paved asphalt surface, stone shoulders and open ditches. Attached as Schedule "D" is a typical rural cross-section from the TAC Geometric Design Manual and the said minimum standards.
- (f) For a period of two (2) years commencing on the Opening Date (as defined in this clause (f)), Nyon shall be responsible for (at the City's option to be exercised as set forth below) either (i) the upkeep, repair (including without limitation repairs to be made under warranty where Nyon will call on the warranty as necessary including upon being advised by the City of the repairs required) and maintenance, including snow removal, of both the New Municipal Access Road and the improved and upgraded portion of the existing Kleinsmith Road in accordance with the City's applicable requirements and policies (and including for greater certainty repair of any deficiencies in the work) or (ii) to reimburse the City for the cost of such upkeep, repair (except that repairs to be made under warranty will be attended to by Nyon which will call on the warranty as necessary upon being advised by the City of the repairs required) and maintenance. The "**Opening Date**" means the date by which all of the construction and other obligations of Nyon under this Agreement have been completed (other than this clause (f) obligation). Nyon shall 120 days before the anticipated Opening Date

notify the City of the anticipated Opening Date and the City shall within 30 days of receiving such notice, notify Nyon whether or not it is exercising the option set forth above in clause (i) or the option set forth above in clause (ii).

- (g) The New Municipal Access Road requires City approval of the name and, subject to such approval, Nyon proposes that the name be "Strategic Energy Drive".
- (h) None of the aforesaid roads will have sidewalks.
- (i) Utilities such as Hydro (poles, lines, etc.) and natural gas will be located on the road allowance and appropriate easements given to the utility authorities. Nyon at its cost will provide all surveys and legal agreements with the utilities as required by those utilities and where needed register same on title before the City accepts transfer of the road to the City.

APPROVALS/REQUIREMENTS

- 2. Nyon shall at its cost obtain all necessary approvals from all Provincial, Regional and City of Port Colborne authorities (including without limitation approval of the detailed plans, specifications terms and conditions) for the proposed changes before any work to implement same is commenced and that this will be at the expense of Nyon, and without limiting the generality of the foregoing, shall at its expense comply with all the requirements of the MTO and the City as set forth in the MTO Letter and in the letter dated December 18, 2014 from the City attached hereto as Schedule "E".

TITLE

- 3. Nyon will transfer the New Municipal Access Road Lands to the City with good title thereto in fee simple free of encumbrance, prior to the issuance of any permit to begin construction of any of the work contemplated by this Agreement.

SCHEDULE

- 4. No work will be started without an approved schedule of start and finish approved by the City, acting reasonably, and identification of what mitigation measures will be implemented by Nyon to ensure that the existing resident of Kleinsmith Road and the owner of the lands on the south side of Kleinsmith Road are not denied ongoing access to their properties.

CONTRIBUTION

- 5. As part of the approval process noted in Section 2 above, the City reserves the right, as part of its approval, to require, acting reasonably, an equitable contribution, taking into consideration the increased assessment and municipal tax revenue and other users, to ongoing maintenance of the New Municipal Access Road and the improved and upgraded existing Kleinsmith Road due to wear and tear expected from the heavy vehicle traffic accessing and leaving the Energy Park Lands from or to Highway 140.

CONDITION PRECEDENT

6. This Agreement shall be conditional upon, and shall only become effective upon, the closing of the Agreement of Purchase and Sale dated January 30, 2006 as amended between Nyon Oil Inc. as purchaser and the City as vendor (the "APS"); and any bylaw closing Parts 55 and 56 on Reference Plan 59R-15312 may at the City's option also provide that such bylaw shall be conditional upon, and shall only become effective upon, the closing of the APS.

GENERAL PROVISIONS

7. All communications which may be or are required to be given by either party to the other herein shall be in writing and, in the case of payments, delivered or sent by prepaid registered mail and, in the case of communications, delivered or sent by prepaid registered mail or by facsimile or email (provided sender obtains evidence or verification of transmission) to the parties at their following respective addresses:

If to the Purchaser at:

200 – 2 Lombard Street
Toronto Ontario
M5C 1M1
Attention: President.
Fax: 416-365-7204
Phone: 416-365-7203

If to the Vendor at:

66 Charlotte Street
Port Colborne, Ontario
L3K 3C8
Attention: Chief Administrative Officer
Fax: 905-835-2969
Phone: 905-835-2900
Email: cao@portcolborne.ca

and if any such payment or communication is sent by prepaid registered mail, it shall, be conclusively deemed to have been received on the third Business Day following the mailing thereof and, if delivered, telecopied or emailed, it shall be conclusively deemed to have been received at the time of delivery or transmission. Notwithstanding the foregoing provisions with respect to mailing, in the event that it may be reasonably anticipated that, due to any strike, lock-out or similar event involving an interruption in postal service, any payment or communication will not be received by the addressee by no later than the third Business Day following the mailing thereof, then the mailing of any such payment or communication as aforesaid shall not be an effective means of sending the same but rather any payment must then be sent by delivery, and any communication by delivery, email or facsimile. Either party may from time to time change its address hereinbefore set forth by notice to the other of them in accordance

with this section. In this Agreement, "**Business Day**" means any day other than Saturday, Sunday or a statutory holiday in the Province of Ontario.

8. This Agreement and the rights and obligations and relations of the parties hereto shall be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada applicable therein (but without giving effect to any conflict of laws rules that may require the application of any of the laws of any other jurisdiction). The parties hereto agree that the Courts of Ontario shall have jurisdiction to entertain any action or other legal proceedings based on any provisions of this Agreement. Each party hereto does hereby attorn to the jurisdiction of the Courts of the Province of Ontario.
9. The parties acknowledge that this is one of a number of agreements arising out of the Purchase Agreement and its completion; however, with respect to the subject matter of this Agreement, this Agreement sets forth this Agreement and constitutes the entire agreement between the parties and there is no representation, warranty, collateral agreement or condition affecting this Agreement except as contained in this Agreement. Each party acknowledges that no amendment of this Agreement shall be effective unless the same is in writing and executed by each of the parties hereto.
10. If any provision of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, the remainder of this Agreement, or the application of such provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby and each provision of this Agreement shall be valid and enforced to the fullest extent permitted by law and be independent of every other provision of this Agreement.
11. This Agreement may not be assigned by Nyon. This Agreement shall enure to the benefit of and be binding upon the parties hereto and their respective successors and permitted assigns.
12. Nothing in this Agreement derogates from, interferes with or fetters the exercise by the City of its rights and obligations (whether discretionary or mandatory) as a municipality, or imposes any obligations on the City's role as a municipality, and the City shall not be prevented from or prejudiced in carrying out any of its statutory rights and responsibilities including its planning rights and responsibilities (or by the City's officers, employees, agents, representatives, or elected or appointed officials of any of their rights and obligations (whether discretionary or mandatory)) or imposes any obligations on the City's officers, employees, agents, representatives, or elected or appointed officials, other than as expressly set out in this Agreement.

IN WITNESS WHEREOF the Parties hereto have hereunto affixed their corporate seals duly attested to by their proper signing officers in that behalf.

**NYON MARINE FUELLING
CORPORATION**

Per _____

Gordon R. Baker
President

I have the authority to bind the Corporation

NYON OIL INC.

Per _____

Gordon R. Baker
President

I have the authority to bind the Corporation

**THE CORPORATION OF THE CITY OF
PORT COLBORNE**

Per _____

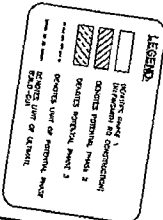
Mayor

Per _____

Clerk

We have the authority to bind the Corporation

CONCEPT PLAN



SCHEDULE "B" TO ROAD AGREEMENT
CURRENT STANDARDS

SCHEDULE "C"

MTO LETTER

From: "Gitkow, Alexandre (MTO)" <Alexandre.Gitkow@ontario.ca>
To: 'Phil Grubb' <pgrubb@ptsl.com>,
Cc: "Gordon R. Baker Q.C." <gord@gordbaker.com>, Kristy Shortall <ShortallK@mmm.ca>, "robertheil@portcolborne.ca" <robertheil@portcolborne.ca>, "cecilvincent@portcolborne.ca" <cecilvincent@portcolborne.ca>
Date: 01/13/14 02:23 PM
Subject: RE: Proposed closure process for Kleinsmith Road

Dear Mr. Grubb,

In principle, the MTO is OK with the proposed new access and closure of Kleinsmith Road. The following are comments from our highway engineering office and traffic office with regard to the letter from Port Colborne dated December 18, 2013 (attach), the site plan (also attach) and the future information that we will require:

- MTO will require a council resolution from Port Colborne, showing that they will open the new road and assume it.
- New access to be constructed/inspected and opened prior to old access being closed.
- Road entrance to be constructed to OPSD standards.
- Sight triangles to be conveyed by deed to MTO, also require a reference plan. This will be to be done prior to issuing an encroachment permit & Land-Use permit
- MTO will need to undertake an OIC in order to lift the designation at the old intersection. And put a designation down where the new access.
- Home owners to be notified by site developer in writing when new road will be opened and old road will be closed. Copy of the letter shall be submitted to MTO
- MTO will require a copy of a Road Closing By-Law
- Developer to provide cost estimate for all works on MTO property, cost to also include Traffic control.
- Ensure the new Access Road and intersection is constructed and signed off by both the ministry and the City before the old road is closed and removed.
- There is a requirement to post regulatory signs on the old road with a set date of closure by the City (G725(English), G725F(French) each sign is 600x900)

Permanent signing:

Upon completion of the new Access Road and closure of old Kleinsmith Road, the following are required:

- Removal of existing and replacement with new intersection ahead warning signs (Wa-13aL, stub on left 75x75), (Wa-13aR 75x75, stub on right)
- Removal of existing and replacement with new Advance and Turn-off guide signs (4 signs total, 2 per direction)

- Addition of a Through Traffic Keep Right” sign for NB Hwy. 140 in advance of the new NB left turn lane into the new Access Road. (Rb-27B 120x210)
- A new Wa-8LR (Checkerboard Sign 120x120) is required on the east side of Hwy. 140 facing the new Access Road.
- A new Road ID sign to be placed to the left of the Wa-8LR. This sign to have North/Nord above a Left arrow, a Crown with 140 in it and South/Sud and a right arrow beneath it. The sign is a G202B and is 90x240 in size.
- IF signals are not being initially installed, a Stop Sign will be required for the new access road Ra-1 (120x120).
- The new Access Road / Kleinsmith Road needs speed limit signs. (city to supply)
- Pending a site review, the addition of a Hwy. 140 North/Nord, or South/Sud route marker may be required.
- Pending a site review, the addition of 80km/h speed limit signs may be required on Hwy. 140
- A Permanent Signing Plan is required for MTO review prior to completion of a Sign order form for the MTO Sign Shop.

Temporary Signing:

- OTM Book 7 signing
- TC-64 signing for lane closures / etc.
- Construction staging plans required for MTO review.

Pavement marking:

- Pavement marking plan required for MTO review.

Illumination:

- If this intersection will be illuminated fully or partially, an illumination plan is required for MTO review.
- All light poles to conform to MTO safe pole policy – this applies to the height of the concrete pole bases as well.

Highway Engineering:

- What is the intersection / road design for the new Access Road at Hwy 140? Lane configuration details are missing.
- What is the new design for Kleinsmith Road after being closed? Cul-de-sac? ‘T’ intersection?
- All the facility needs to be outside of the setback limits (14m setback from property line)
- Needs to submit drainage assessment
- MTO will require you to submit a traffic construction staging plan for the road closure and new road construction
- MTO will need to see a more complete set of drawing including but not limited to roadway / intersection design, cross section / typical, drainage, electrical, fire route, etc

- MTO will require a lighting plan and signage plans

Please do not hesitate to contact me should you require more information.

Sincerely Yours,

Alexandre Gitkow

Corridor Management Officer, Central Region

Corridor Management Section

Tel: (416) 235-4387

Fax: (416)-235-4267

alexandre.gitkow@ontario.ca

SCHEDULE "D" TO ROAD AGREEMENT
TYPICAL RURAL CROSS-SECTION

SCHEDULE "E" TO ROAD AGREEMENT
CITY LETTER DATED DECEMBER 18, 2014



CITY OF PORT COLBORNE

Municipal Offices
66 Charlotte Street
Port Colborne, Ontario
L3K 3C8
www.portcolborne.ca

SPECIAL PROJECTS AND STRATEGIC INITIATIVES

December 18, 2014

Alexandre Gitkow
Permits Officer, Central Region
Corridor Management Section

Dear Mr Gitkow,

Re: Proposed closure of Kleinsmith Road access to Highway 140, Port Colborne

I have been requested to provide to you the current status of the City of Port Colborne's approval of the proposed closure of Kleinsmith Road access to Highway 140. City Council on December 10, 2012 approved the following direction to staff regarding the proposed Energy park development and this has been communicated to the proponent Nyon Oil Inc.

"Department of Chief Administrative Officer, Special Projects & Corporate Strategic Initiatives, Report No. 2012-9, Subject: Request from Nyon Oil Inc. for the City of Port Colborne to consider approval of a new access from Highway 140 to the proposed Energy Park Lands including the closure of the existing Kleinsmith Road entrance and replacement with the new access.

Council resolved:

That based upon the following terms City Council supports the request from Nyon Oil Inc. for a new access from the Port Colborne Energy Park as described in the November 22, 2012 correspondence from Nyon Oil Inc.; and

That no action regarding the changes in access be commenced other than obtaining Regional and Provincial approvals in principle until after the current Ontario Municipal Board hearings have been completed; and further

That the terms listed below form a prerequisite for final Council approval of the proposed new access described above:

- a. All costs associated with the closure of the existing Kleinsmith Road access to Highway 140 as proposed in the Nyon Oil Inc. letter and attached map showing the proposed configuration of same be at the sole cost of Nyon Oil Inc.

Telephone: 905-835-2900

Email: cao@portcolborne.ca

Fax: 905-835-2969

December 19, 2014
To: Alexandre Gitkow
Re: Proposed closure of Kleinsmith Road
access to Highway 140, Port Colborne

Page 2 of 3

- b. No actual work be started until this arrangement has been confirmed in an appropriate legal agreement to reflect same to the City of Port Colborne's satisfaction.
- c. That Nyon Oil Inc. meet with the affected residents and identify any issues that require mitigation and to provide a list of same to the City along with their proposed mitigations of same. Council while not agreeing to mitigate these may have to judge the appropriateness of both the issues and the proposed mitigation to decide a final response to this request.
- d. That Nyon Oil Inc. obtain approvals from all Provincial, Regional and City of Port Colborne technical and legal authorities for the proposed changes before any work to implement same is commenced and that this will be at the full expense of Nyon Oil Inc.
- e. Legal Title without conditions for the proposed new municipal access and connection to the existing Kleinsmith properties will be transferred to the City as a part of any permit process to begin construction of the proposed new access.
- f. No work will be started without an approved schedule of start and finish approved by the City of Port Colborne and an identification of what mitigation measures will be implemented to ensure the existing resident of Kleinsmith road is not denied ongoing access to that residence.
- g. As a part of approval process noted in (d) the City reserves the right as a part of its approval to require a contribution to ongoing maintenance of the proposed new municipal access for wear expected from the heavy vehicle traffic access and leaving the Energy Park Project.
- h. The proposed internal servicing network will be a private road network until and unless the proponent and the City of Port Colborne negotiate a different ownership arrangement at a future date.
- i. Zoning and Official Plan be regularized for the two private properties (if required) based on the changes in road access, frontage etc. all at the expense of Nyon Oil Inc.
- j. As part of approval process noted in (c), that staff be directed to attend the meetings between Nyon Oil Inc. and affected residents and communicate directly with the landowners on matters pertaining to Kleinsmith Road."

Appendix B5

2024 Construction Access Review



2024-07-02
Project: 230726

One Forty Development Inc.
Box 365
Otterville ON N0J 1R0

**RE: KLEINSMITH ROAD - CONSTRUCTION ACCESS AUTOTURN REVIEW,
PORT COLBORNE, ON**

The Ministry of Transportation of Ontario (MTO) has provided preliminary comments that additional review with respect to utilizing Kleinsmith Road as a construction access should be completed to determine the turning movements of construction vehicles.

This letter has been prepared by Paradigm Transportation Solutions Limited (Paradigm) to review the turning movements along Kleinsmith Road. This letter is intended to provide the Applicant and the MTO with a high-level overview of the proposed turning movements. It should not be interpreted as a detailed access review and engineering assessment of the Kleinsmith Road construction access.

Kleinsmith Road is an existing municipal road located about 950 m north of the intersection of Forks Road and Highway 140. It currently intersects with Highway 140, essentially serving as a driveway to an adjacent residential dwelling. It extends north and south parallel to Highway 140, presumably to provide access to future development of the adjacent designated industrial land. Kleinsmith Road is presently a gravel roadway and provides access to a single-family residence.

Turning Characteristics

A turning characteristics assessment has been completed to review the current geometrics of Kleinsmith Road to determine if the existing roadway design and alignment are sufficient to accommodate large trucks. As the purpose of the construction access is to facilitate trucks daily, a WB-20 has been utilized in the assessment as the design vehicle.

The assessment was carried out using AutoTURN software, which overlaid the existing right-of-way limits and an aerial photo. The plan and the design vehicle (WB-20) were taken from the Transportation Association of Canada (TAC) standard design vehicles. Based on the AutoTURN assessment, the following issues have been identified:



- ▶ **Inbound: Highway 140 at Kleinsmith Road (Southbound Right-Turn)** – Trucks performing a southbound right-turn movement along Highway 140 to turn onto Kleinsmith Road are able to complete the movement without encroaching in the opposing travel lane along Kleinsmith Road.
- ▶ **Outbound: Highway 140 at Kleinsmith Road (Eastbound Right-Turn)** – Trucks performing a right turn movement along Kleinsmith Road to turn onto Highway 140 cannot complete the turning movements within the current roadway platform. An increased curb radius for the southwest corner would likely be required if outbound trucks are permitted to travel south.
 - However, if trucks are not expected to travel south along Highway 140, no modifications to the curb radius would be required.
- ▶ **Kleinsmith Road at North/South Temporary Road (Westbound Right-Turn)** – Trucks performing a right-turn movement along Kleinsmith Road to turn onto the temporary north-south road would need to utilize a significant portion of land outside of the current roadway platform, likely impacting the swale along the north side of Kleinsmith Road. A hydro pole on the north side of Kleinsmith Road will also be impacted and need to be relocated to facilitate truck movements adequately. This movement is shown as Option 1 on the drawing set.

However, several alternative movements have been modelled and indicate that it is possible to have a truck complete the movement through the following options:

Option 2 – The WB-20 will need to perform a partial 45-degree right turn movement through the intersection. The WB-20 will then need to reverse and perform a three-point turn.

Option 3 – The WB-20 will need to perform a left turn movement from Kleinsmith Road onto the unopened road allowance. The WB-20 will then need to reverse into the farm field entrance at the west limit of Kleinsmith Road. The WB-20 would then need to perform a left-turn movement from the farm field entrance onto the unopened road allowance.

Option 4 – The WB-20 will need to perform a left from Kleinsmith Road onto the unopened road allowance. The WB-20 would then perform a reverse maneuver through the length of the unopened road allowance.

- As it is expected that there will be a low volume of construction traffic for the initial stages of construction (i.e. site grading), the inbound movement either through Option 2 to Option 4 is likely feasible given the low volume of truck traffic projected and the limited conflicts expected between inbound and outbound movements. If Option 4 is selected as the preferred option, it is recommended that a flag person be employed to guide the WB-20 along the unopened road allowance through a backing-up maneuver. However, truck volumes would significantly increase through advanced stages of construction, thus increasing the potential for conflicts. As a result, further modifications and upgrades to Kleinsmith Road would be required to support the Kleinsmith Road as a permanent construction entrance.



Appendix A includes the AutoTURN movements.

Summary

Based on the following review, Kleinsmith Road is likely feasible as an interim construction access that could support low volumes of traffic utilizing the connection. However, truck volumes would significantly increase through the advanced stages of construction, thus increasing the potential for conflicts along the construction access route. As a result, construction access as a permanent solution would not be recommended.

Yours very truly,

PARADIGM TRANSPORTATION SOLUTIONS LIMITED



Adam J. Makarewicz
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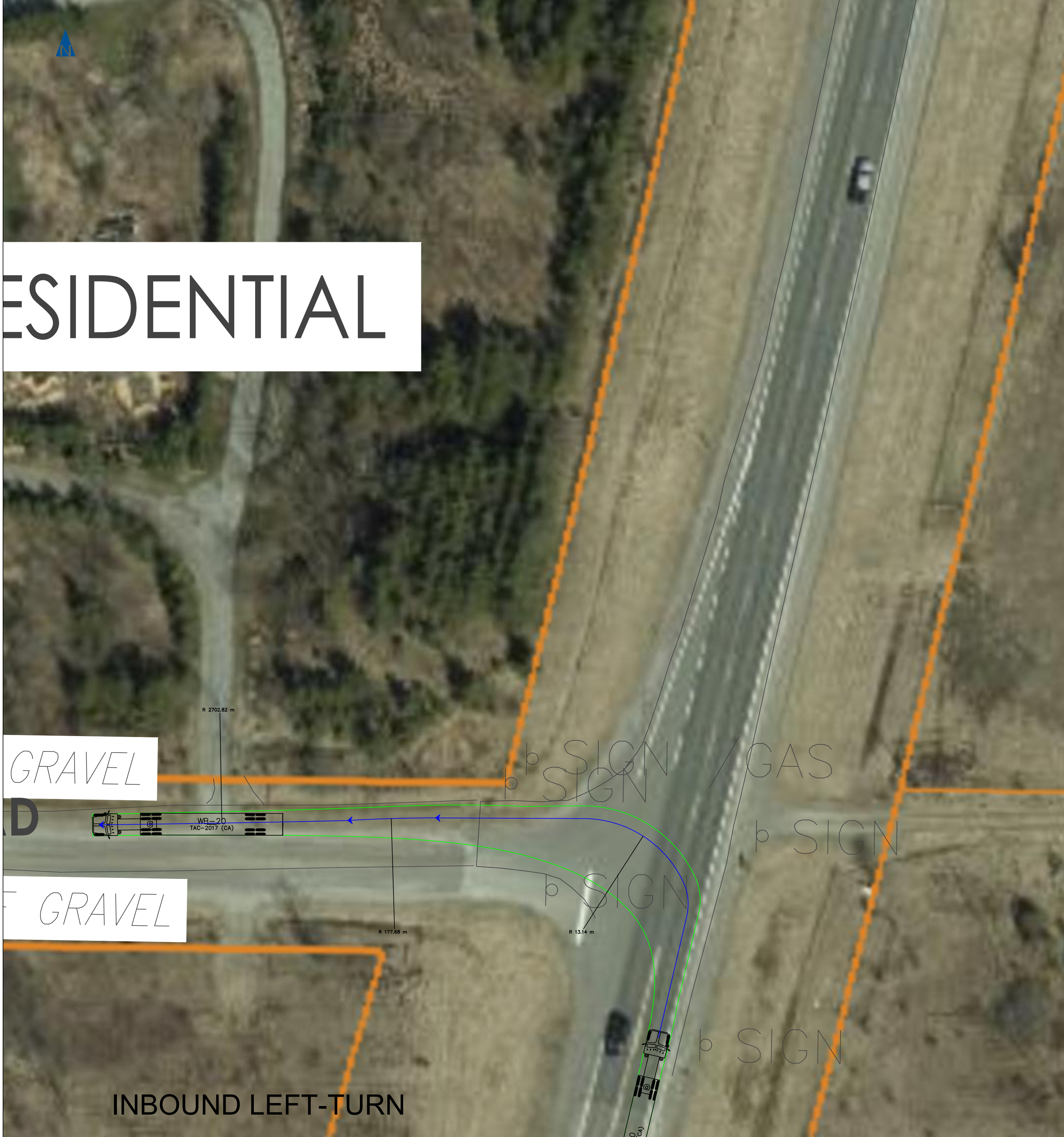
Stew Elkins
B.E.S., MITE
Vice President



Appendix A

AUTOTURN ASSESSMENT





NOTES

1. 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.

NO.	DATE	INITIAL	REVISION DETAIL
DRAWING STATUS		ISSUED FOR REVIEW	
APPROVED		DATE: _____	
SIGNATURE _____			

DESIGN VEHICLE

WB-20

Truck Width	3.00	Lock to Lock Time	6.0
Truck Depth	2.00	Minimum Angle	25.0
Truck Height	2.00	Articulating Angle	75.0
Truck Length	17.00		

AUTOTURN ASSESSMENT
5088 HIGHWAY 140
PORT COLBORNE, ON

PROJECT NO.: 230726	DATE: JUNE 2024	SCALE: 1:300	DRAWING NO.:
DRAWN: LC	DESIGN: LC	CHECK: AMa	02

Appendix C

Time-of-Day-Distribution



Hourly Distribution of Entering and Exiting Vehicle Trips by Land Use												
Source: ITE Trip Generation Manual , 11th Edition												
Land Use Code	140											
Land Use	Manufacturing											
Setting	General Urban/Suburban											
Time Period	Weekday											
# Data Sites	20											
	% of 24-Hour Vehicle Trips			Phase 1: 24-Hour Vehicle Trips			Phases 1-2: 24-Hour Vehicle Trips			Phases 1-3: 24-Hour Vehicle Trips		
Time	Total	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting
12:00 - 1:00 AM	1.2%	0.4%	2.0%	15	3	13	23	4	19	26	5	22
12:15 - 1:15 AM	0.9%	0.3%	1.6%	12	2	10	18	2	16	21	3	18
12:30 - 1:30 AM	1.0%	0.3%	1.8%	13	2	11	20	3	17	23	3	20
12:45 - 1:45 AM	0.9%	0.3%	1.5%	11	2	10	17	3	15	20	3	17
1:00 - 2:00 AM	0.9%	0.3%	1.4%	11	2	9	17	3	14	19	3	16
1:15 - 2:15 AM	0.3%	0.2%	0.5%	4	1	3	7	2	5	8	2	6
1:30 - 2:30 AM	0.2%	0.1%	0.3%	3	1	2	4	1	3	5	1	3
1:45 - 2:45 AM	0.5%	0.3%	0.7%	6	2	4	9	2	6	10	3	7
2:00 - 3:00 AM	0.7%	0.3%	1.0%	8	2	6	13	3	10	15	4	11
2:15 - 3:15 AM	0.9%	0.4%	1.4%	11	3	9	17	4	14	20	4	16
2:30 - 3:30 AM	0.9%	0.4%	1.4%	11	3	9	17	4	13	19	4	15
2:45 - 3:45 AM	0.6%	0.3%	1.0%	8	2	6	12	3	9	14	3	11
3:00 - 4:00 AM	0.5%	0.4%	0.7%	7	3	4	10	4	6	12	5	7
3:15 - 4:15 AM	0.5%	0.7%	0.3%	7	5	2	10	7	3	11	8	3
3:30 - 4:30 AM	0.6%	0.9%	0.3%	8	6	2	12	9	3	13	10	3
3:45 - 4:45 AM	0.7%	1.0%	0.4%	9	6	3	14	10	4	16	11	4
4:00 - 5:00 AM	0.8%	1.3%	0.3%	10	8	2	16	13	3	18	14	3
4:15 - 5:15 AM	0.8%	1.4%	0.2%	10	9	2	15	13	2	18	15	3
4:30 - 5:30 AM	0.9%	1.5%	0.3%	11	9	2	17	14	3	19	16	3
4:45 - 5:45 AM	1.1%	2.0%	0.2%	14	12	1	21	19	2	24	22	2
5:00 - 6:00 AM	1.6%	3.0%	0.1%	20	19	1	31	29	1	35	33	2
5:15 - 6:15 AM	3.6%	6.7%	0.4%	45	42	2	69	64	4	78	74	4
5:30 - 6:30 AM	5.1%	9.4%	0.8%	65	59	5	99	91	7	113	104	8
5:45 - 6:45 AM	7.7%	13.8%	1.5%	97	87	9	148	133	14	169	152	16
6:00 - 7:00 AM	9.9%	17.1%	2.6%	125	108	17	191	164	25	218	188	29
6:15 - 7:15 AM	10.2%	16.9%	3.3%	129	107	21	196	163	32	224	186	36
6:30 - 7:30 AM	10.9%	18.0%	3.6%	137	114	23	209	173	34	239	198	39
6:45 - 7:45 AM	9.7%	15.6%	3.7%	123	99	23	187	150	36	214	172	41
7:00 - 8:00 AM	8.5%	13.7%	3.2%	108	87	21	164	132	31	188	151	36
7:15 - 8:15 AM	7.7%	12.3%	3.1%	97	78	19	148	118	29	169	135	34
7:30 - 8:30 AM	6.4%	9.8%	2.9%	81	62	19	123	95	28	141	108	32
7:45 - 8:45 AM	5.6%	8.3%	2.8%	70	52	18	107	80	27	122	91	31
8:00 - 9:00 AM	4.4%	6.2%	2.7%	56	39	17	86	60	26	98	68	29
8:15 - 9:15 AM	3.6%	4.6%	2.6%	46	29	17	70	45	25	80	51	29
8:30 - 9:30 AM	3.3%	4.0%	2.7%	42	25	17	64	38	26	73	44	30
8:45 - 9:45 AM	3.3%	3.7%	2.9%	42	24	18	64	36	28	73	41	32
9:00 - 10:00 AM	3.4%	3.9%	3.0%	43	25	19	66	37	28	75	43	33
9:15 - 10:15 AM	3.5%	4.0%	3.0%	45	26	19	68	39	29	78	45	33
9:30 - 10:30 AM	3.4%	3.7%	3.1%	43	23	20	66	36	30	75	41	34
9:45 - 10:45 AM	3.4%	3.7%	3.1%	43	23	20	65	35	30	74	40	34
10:00 - 11:00 AM	3.2%	3.3%	3.0%	40	21	19	61	32	29	70	37	33
10:15 - 11:15 AM	3.4%	3.6%	3.3%	43	22	21	66	34	32	75	39	36
10:30 - 11:30 AM	4.0%	4.4%	3.5%	50	28	22	76	42	34	87	48	39
10:45 - 11:45 AM	4.5%	5.1%	4.0%	57	32	25	87	49	38	100	56	44
11:00 - 12:00 PM	5.6%	6.3%	4.9%	70	40	31	107	60	47	122	69	54
11:15 - 12:15 PM	6.8%	7.4%	6.2%	86	47	39	130	71	59	149	81	68
11:30 - 12:30 PM	7.2%	7.7%	6.7%	91	49	42	138	74	64	158	85	74
11:45 - 12:45 PM	7.6%	8.5%	6.7%	96	54	42	146	82	64	167	94	74
12:00 - 1:00 PM	7.6%	8.9%	6.3%	96	57	40	146	86	60	167	98	69
12:15 - 1:15 PM	6.6%	7.9%	5.2%	83	50	33	126	76	50	145	87	57
12:30 - 1:30 PM	6.5%	7.8%	5.2%	82	49	33	125	75	50	143	86	57
12:45 - 1:45 PM	6.7%	7.4%	6.2%	85	46	39	130	71	59	148	81	68
1:00 - 2:00 PM	6.7%	6.7%	6.7%	85	43	42	129	65	65	148	74	74
1:15 - 2:15 PM	6.7%	6.7%	6.8%	85	43	43	130	65	65	148	74	74
1:30 - 2:30 PM	6.4%	6.3%	6.7%	81	40	42	124	60	64	142	69	73
1:45 - 2:45 PM	6.4%	5.7%	7.1%	80	36	45	122	54	68	140	62	78
2:00 - 3:00 PM	6.1%	5.1%	7.1%	77	32	45	117	49	68	134	56	78
2:15 - 3:15 PM	7.7%	5.0%	10.5%	97	32	66	148	48	101	169	55	115
2:30 - 3:30 PM	10.1%	5.8%	14.6%	128	37	92	195	56	141	223	64	161
2:45 - 3:45 PM	13.2%	7.4%	19.2%	167	47	121	254	71	184	290	81	211
3:00 - 4:00 PM	14.9%	9.4%	20.6%	188	59	130	287	90	198	328	103	227
3:15 - 4:15 PM	14.7%	10.1%	19.5%	186	64	124	283	97	188	324	111	215
3:30 - 4:30 PM	12.7%	8.7%	16.8%	160	55	106	244	83	162	279	95	185
3:45 - 4:45 PM	9.4%	6.3%	12.6%	119	40	80	181	60	122	207	69	139
4:00 - 5:00 PM	7.4%	3.4%	11.5%	94	22	73	143	33	111	163	38	127
4:15 - 5:15 PM	7.4%	2.0%	12.8%	93	13	81	142	20	124	162	22	141
4:30 - 5:30 PM	6.7%	2.1%	11.5%	85	13	72	129	20	110	148	23	126
4:45 - 5:45 PM	5.9%	2.2%	9.8%	75	14	62	114	21	94	130	24	107
5:00 - 6:00 PM	6.1%	2.6%	9.6%	76	16	61	116	25	92	133	29	106
5:15 - 6:15 PM	4.1%	2.3%	6.1%	52	14	38	80	22	58	91	25	67
5:30 - 6:30 PM	3.5%	2.0%	5.1%	45	13	32	68	19	49	78	22	56
5:45 - 6:45 PM	2.9%	1.8%	4.0%	36	11	25	55	17	39	63	19	44
6:00 - 7:00 PM	1.9%	1.2%	2.7%	25	8	17	37	12	26	43	14	29
6:15 - 7:15 PM	1.6%	1.4%	1.8%	20	9	12	31	14	18	36	15	20
6:30 - 7:30 PM	1.6%	1.4%	1.8%	20	9	11	31	14	17	35	16	19
6:45 - 7:45 PM	1.4%	1.2%	1.6%	18	8	10	27	12	15	31	13	17
7:00 - 8:00 PM	1.3%	1.1%	1.5%	16	7	9	25	10	14	28	12	16
7:15 - 8:15 PM	1.1%	0.9%	1.3%	14	5	8	21	8	13	24	10	15
7:30 - 8:30 PM	1.0%	0.7%	1.2%	12	5	8	19	7	12	21	8	13
7:45 - 8:45 PM	1.1%	0.8%	1.4%	14	5	9	22	8	14	25	9	15
8:00 - 9:00 PM	1.2%	1.0%	1.5%	16	6	10	24	9	15	27	11	17
8:15 - 9:15 PM	1.1%	0.9%	1.4%	14	6	9	22	9	13	25	10	15
8:30 - 9:30 PM	1.1%	0.9%	1.3%	14	6	8	22	9	13	25	10	15
8:45 - 9:45 PM	1.1%	1.0%	1.2%	14	6	8	21	9	12	24	11	14
9:00 - 10:00 PM	1.6%	1.2%	2.1%	21	8	13	32	11	20	36	13	23
9:15 - 10:15 PM	2.1%	1.5%	2.8%	27	10	17	41	15	27	47	17	30
9:30 - 10:30 PM	2.3%	1.8%	2.8%	29	11	18	44	17	27	50	19	31
9:45 - 10:45 PM	2.4%	1.7%	3.1%	30	11	19	45	16	29	52	19	34
10:00 - 11:00 PM	2.0%	1.7%	2.4%	25	11	15	39	16	23	44	19	26
10:15 - 11:15 PM	1.8%	1.3%	2.0%	23	8	13	35	13	19	40	15	22
10:30 - 11:30 PM	1.9%	1.1%	2.2%	23	7	14	36	11	22	41	12	25
10:45 - 11:45 PM	1.9%	1.2%	2.3%	24	8	14	37	12	22	42	14	25
11:00 - 12:00 AM	2.3%	1.3%	3.1%	29	8	19	45	12	29	51	14	34
11:15 - 12:15 AM	2.6%	1.4%	3.8%	33	9	24	50	14	37	57	15	42
11:30 - 12:30 AM	2.3%	1.2%	3.5%	29	8	22	44	11	33	51	13	38
11:45 - 12:45 AM	2.0%	0.9%	3.2%	26	5	21	39	8	31	45	10	36

Hourly Distribution of Entering and Exiting Truck Trips by Land Use												
Source: ITE Trip Generation Manual , 11th Edition												
Land Use Code	140											
Land Use	Manufacturing											
Setting	General Urban/Suburban											
Time Period	Weekday											
# Data Sites	19											
	% of 24-Hour Truck Trips			88			44			44		
				170			85			85		
				206			103			103		
Time	Total	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting	Total	Entering	Exiting
12:00 - 1:00 AM	0.5%	0.5%	0.5%	0	0	0	1	0	0	1	0	0
12:15 - 1:15 AM	0.1%	0.2%	0.0%	0	0	0	0	0	0	0	0	0
12:30 - 1:30 AM	0.1%	0.0%	0.2%	0	0	0	0	0	0	0	0	0
12:45 - 1:45 AM	0.5%	0.2%	0.7%	0	0	0	1	0	1	1	0	1
1:00 - 2:00 AM	0.6%	0.5%	0.7%	1	0	0	1	0	1	1	0	1
1:15 - 2:15 AM	0.6%	0.5%	0.7%	1	0	0	1	0	1	1	0	1
1:30 - 2:30 AM	0.6%	0.5%	0.7%	1	0	0	1	0	1	1	0	1
1:45 - 2:45 AM	0.5%	0.7%	0.2%	0	0	0	1	1	0	1	1	0
2:00 - 3:00 AM	0.7%	0.5%	0.9%	1	0	0	1	0	1	1	0	1
2:15 - 3:15 AM	1.4%	0.9%	1.9%	1	0	1	2	1	2	3	1	2
2:30 - 3:30 AM	1.3%	0.9%	1.6%	1	0	1	2	1	1	3	1	2
2:45 - 3:45 AM	1.2%	0.7%	1.6%	1	0	1	2	1	1	2	1	2
3:00 - 4:00 AM	1.3%	0.9%	1.6%	1	0	1	2	1	1	3	1	2
3:15 - 4:15 AM	0.7%	0.7%	0.7%	1	0	0	1	1	1	1	1	1
3:30 - 4:30 AM	0.8%	0.9%	0.7%	1	0	0	1	1	1	2	1	1
3:45 - 4:45 AM	1.1%	0.9%	1.2%	1	0	1	2	1	1	2	1	1
4:00 - 5:00 AM	0.9%	1.2%	0.7%	1	1	0	2	1	1	2	1	1
4:15 - 5:15 AM	0.8%	0.9%	0.7%	1	0	0	1	1	1	2	1	1
4:30 - 5:30 AM	0.7%	0.7%	0.7%	1	0	0	1	1	1	1	1	1
4:45 - 5:45 AM	0.4%	0.5%	0.2%	0	0	0	1	0	0	1	0	0
5:00 - 6:00 AM	0.0%	0.0%	0.0%	0	0	0	0	0	0	0	0	0
5:15 - 6:15 AM	1.3%	1.9%	0.7%	1	1	0	2	2	1	3	2	1
5:30 - 6:30 AM	2.6%	3.0%	2.1%	2	1	1	4	3	2	5	3	2
5:45 - 6:45 AM	3.4%	3.7%	3.0%	3	2	1	6	3	3	7	4	3
6:00 - 7:00 AM	4.2%	4.9%	3.5%	4	2	2	7	4	3	9	5	4
6:15 - 7:15 AM	4.0%	4.4%	3.5%	3	2	2	7	4	3	8	5	4
6:30 - 7:30 AM	3.6%	4.2%	3.0%	3	2	1	6	4	3	7	4	3
6:45 - 7:45 AM	3.5%	4.4%	2.6%	3	2	1	6	4	2	7	5	3
7:00 - 8:00 AM	4.4%	5.1%	3.7%	4	2	2	8	4	3	9	5	4
7:15 - 8:15 AM	5.6%	6.0%	5.2%	5	3	2	10	5	4	12	6	5
7:30 - 8:30 AM	6.4%	7.2%	5.6%	6	3	2	11	6	5	13	7	6
7:45 - 8:45 AM	7.0%	7.7%	6.3%	6	3	3	12	7	5	14	8	7
8:00 - 9:00 AM	7.8%	7.9%	7.7%	7	3	3	13	7	7	16	8	8
8:15 - 9:15 AM	7.8%	7.7%	8.0%	7	3	4	13	7	7	16	8	8
8:30 - 9:30 AM	8.3%	7.9%	8.7%	7	3	4	14	7	7	17	8	9
8:45 - 9:45 AM	10.2%	9.8%	10.5%	9	4	5	17	8	9	21	10	11
9:00 - 10:00 AM	10.2%	10.0%	10.3%	9	4	5	17	9	9	21	10	11
9:15 - 10:15 AM	11.2%	11.6%	10.8%	10	5	5	19	10	9	23	12	11
9:30 - 10:30 AM	10.5%	10.9%	10.1%	9	5	4	18	9	9	22	11	10
9:45 - 10:45 AM	10.7%	11.2%	10.3%	9	5	5	18	9	9	22	11	11
10:00 - 11:00 AM	11.1%	12.3%	9.8%	10	5	4	19	10	8	23	13	10
10:15 - 11:15 AM	9.8%	10.5%	9.1%	9	5	4	17	9	8	20	11	9
10:30 - 11:30 AM	10.6%	11.4%	9.8%	9	5	4	18	10	8	22	12	10
10:45 - 11:45 AM	10.5%	11.2%	9.8%	9	5	4	18	9	8	22	11	10
11:00 - 12:00 PM	9.7%	9.8%	9.6%	9	4	4	16	8	8	20	10	10
11:15 - 12:15 PM	9.8%	10.2%	9.4%	9	5	4	17	9	8	20	11	10
11:30 - 12:30 PM	9.5%	10.0%	8.9%	8	4	4	16	9	8	19	10	9
11:45 - 12:45 PM	7.9%	7.7%	8.2%	7	3	4	13	7	7	16	8	8
12:00 - 1:00 PM	7.8%	7.0%	8.7%	7	3	4	13	6	7	16	7	9
12:15 - 1:15 PM	7.5%	6.7%	8.2%	7	3	4	13	6	7	15	7	8
12:30 - 1:30 PM	7.7%	7.0%	8.4%	7	3	4	13	6	7	16	7	9
12:45 - 1:45 PM	7.8%	8.6%	7.0%	7	4	3	13	7	6	16	9	7
1:00 - 2:00 PM	7.6%	9.1%	6.1%	7	4	3	13	8	5	16	9	6
1:15 - 2:15 PM	7.5%	8.4%	6.6%	7	4	3	13	7	6	15	9	7
1:30 - 2:30 PM	7.0%	7.0%	7.0%	6	3	3	12	6	6	14	7	7
1:45 - 2:45 PM	7.4%	6.7%	8.0%	6	3	4	12	6	7	15	7	8
2:00 - 3:00 PM	6.8%	5.8%	7.7%	6	3	3	12	5	7	14	6	8
2:15 - 3:15 PM	6.9%	6.0%	7.7%	6	3	3	12	5	7	14	6	8
2:30 - 3:30 PM	8.1%	7.9%	8.2%	7	3	4	14	7	7	17	8	8
2:45 - 3:45 PM	8.6%	7.7%	9.6%	8	3	4	15	7	8	18	8	10
3:00 - 4:00 PM	9.7%	8.6%	10.8%	9	4	5	16	7	9	20	9	11
3:15 - 4:15 PM	9.5%	7.9%	11.0%	8	3	5	16	7	9	19	8	11
3:30 - 4:30 PM	7.1%	5.6%	8.7%	6	2	4	12	5	7	15	6	9
3:45 - 4:45 PM	6.0%	5.1%	6.8%	5	2	3	10	4	6	12	5	7
4:00 - 5:00 PM	4.9%	4.2%	5.6%	4	2	2	8	4	5	10	4	6
4:15 - 5:15 PM	4.6%	4.0%	5.2%	4	2	2	8	3	4	9	4	5
4:30 - 5:30 PM	4.7%	3.7%	5.6%	4	2	2	8	3	5	10	4	6
4:45 - 5:45 PM	3.7%	3.0%	4.4%	3	1	2	6	3	4	8	3	5
5:00 - 6:00 PM	3.6%	3.5%	3.7%	3	2	2	6	3	3	7	4	4
5:15 - 6:15 PM	3.3%	3.3%	3.3%	3	1	1	6	3	3	7	3	3
5:30 - 6:30 PM	2.9%	3.0%	2.8%	3	1	1	5	3	2	6	3	3
5:45 - 6:45 PM	2.9%	3.3%	2.6%	3	1	1	5	3	2	6	3	3
6:00 - 7:00 PM	2.1%	2.1%	2.1%	2	1	1	4	2	2	4	2	2
6:15 - 7:15 PM	1.8%	2.3%	1.2%	2	1	1	3	2	1	4	2	1
6:30 - 7:30 PM	2.0%	2.8%	1.2%	2	1	1	3	2	1	4	3	1
6:45 - 7:45 PM	1.6%	2.1%	1.2%	1	1	1	3	2	1	3	2	1
7:00 - 8:00 PM	1.4%	1.9%	0.9%	1	1	0	2	2	1	3	2	1
7:15 - 8:15 PM	1.4%	1.6%	1.2%	1	1	1	2	1	1	3	2	1
7:30 - 8:30 PM	0.8%	0.9%	0.7%	1	0	0	1	1	1	2	1	1
7:45 - 8:45 PM	0.7%	0.7%	0.7%	1	0	0	1	1	1	1	1	1
8:00 - 9:00 PM	1.5%	1.4%	1.6%	1	1	1	3	1	1	3	1	2
8:15 - 9:15 PM	1.2%	1.2%	1.2%	1	1	1	2	1	1	2	1	1
8:30 - 9:30 PM	1.4%	1.6%	1.2%	1	1	1	2	1	1	3	2	1
8:45 - 9:45 PM	1.6%	2.1%	1.2%	1	1	1	3	2	1	3	2	1
9:00 - 10:00 PM	1.2%	1.6%	0.7%	1	1	0	2	1	1	2	2	1
9:15 - 10:15 PM	1.2%	1.4%	0.9%	1	1	0	2	1	1	2	1	1
9:30 - 10:30 PM	0.9%	0.9%	0.9%	1	0	0	2	1	1	2	1	1
9:45 - 10:45 PM	0.8%	0.5%	1.2%	1	0	1	1	0	1	2	0	1
10:00 - 11:00 PM	0.9%	0.5%	1.4%	1	0	1	2	0	1	2	0	1
10:15 - 11:15 PM	1.2%	0.9%	1.4%	1	0	1	2	1	1	2	1	1
10:30 - 11:30 PM	1.8%	1.4%	2.1%	2	1	1	3	1	2	4	1	2
10:45 - 11:45 PM	1.6%	1.2%	2.1%	1	1	1	3	1	2	3	1	2
11:00 - 12:00 AM	1.2%	0.9%	1.4%	1	0	1	2	1	1	2	1	1
11:15 - 12:15 AM	1.2%	0.7%	1.6%	1	0	1	2	1	1	2	1	2
11:30 - 12:30 AM	0.7%	0.5%	0.9%	1	0	0	1	0	1	1	0	1
11:45 - 12:45 AM	0.5%	0.5%	0.5%	0	0	0	1	0	0	1	0	0

400.0%

Appendix D

Passenger Car Equivalent Estimates (PCE)

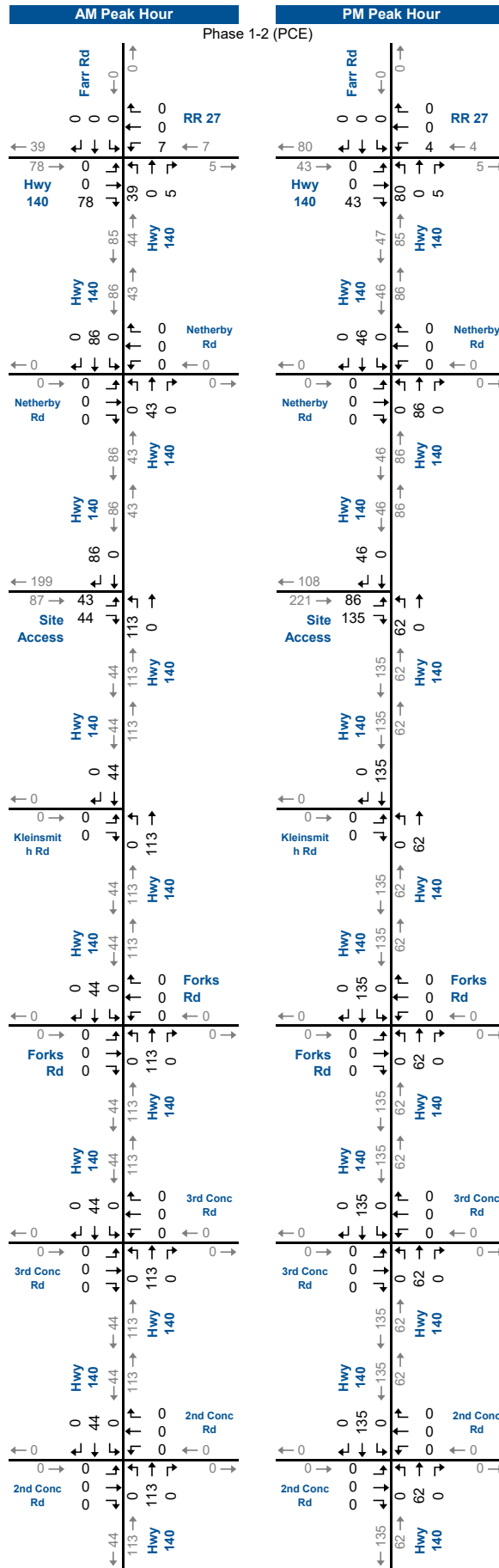


PM Peak Hour

The figure consists of two diagrams illustrating a typical intersection layout for a four-lane highway with a median.

Plan View: This diagram shows a top-down view of the intersection. It features a central vertical corridor representing the main highway (Hwy 140) with a median. Intersecting roads include Farr Rd at the top, RR 27, Netherby Rd, Site Access, Kleinsmith Rd, Forks Rd, 3rd Conc Rd, 2nd Conc Rd, and Hwy 140 running horizontally. Arrows indicate traffic flow directions. Distances or lane widths are marked with numbers (e.g., 48, 23, 52, 27, 70, 41, 88, 0).

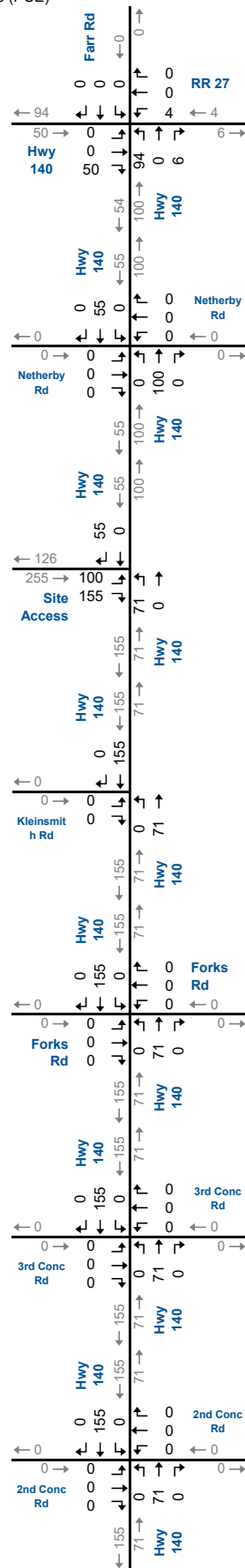
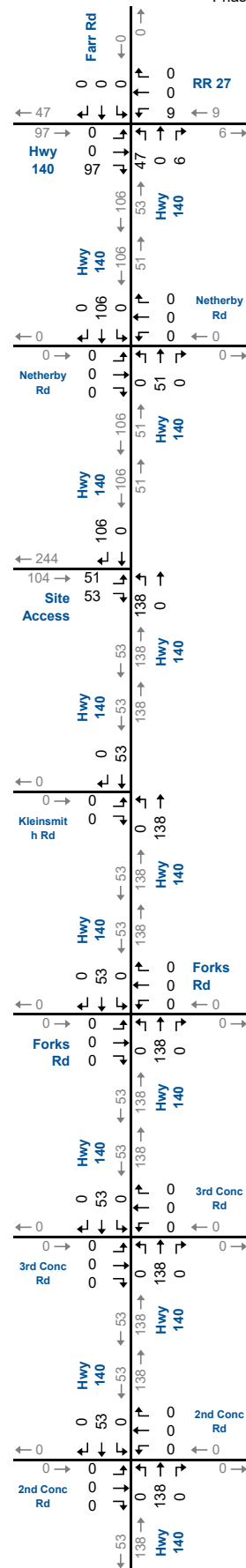
Elevation View: This diagram shows a side-on view of the intersection, highlighting the vertical alignment and sight triangles. It shows the same roads as the Plan View, but from a perspective that emphasizes the vertical clearance and the sight lines for vehicles approaching the intersection. The vertical alignment of the roads is shown with curves and grades. Key features include the median, the intersection points, and the sight triangles for various approaches.



AM Peak Hour

PM Peak Hour

Phase 1-3 (PCE)



PM Peak Hour

Figure 10 consists of two diagrams illustrating proposed traffic flow for Alternative 1 (Hwy 140). The diagrams show a central vertical road (Hwy 140) with various side roads crossing it. Traffic flow is indicated by arrows and numbers representing volumes.

Left Diagram (Alternative 1):

- Top Section:** Farr Rd (0 left, 0 right), RR 27 (0 left, 49 right), Hwy 140 (121 left, 0 right).
- Middle Section:** Netherby Rd (0 left, 0 right), Site Access (104 left, 94 right), Hwy 140 (219 left, 0 right).
- Lower Middle Section:** Kleinsmith Rd (0 left, 0 right), Hwy 140 (0 left, 25 right).
- Bottom Section:** Forks Rd (0 left, 0 right), 3rd Conc Rd (0 left, 0 right), 2nd Conc Rd (0 left, 0 right).

Right Diagram (Alternative 2):

- Top Section:** Farr Rd (0 left, 0 right), RR 27 (0 left, 25 right), Hwy 140 (62 left, 0 right).
- Middle Section:** Netherby Rd (0 left, 0 right), Site Access (255 left, 229 right), Hwy 140 (114 left, 0 right).
- Lower Middle Section:** Kleinsmith Rd (0 left, 0 right), Hwy 140 (0 left, 12 right).
- Bottom Section:** Forks Rd (0 left, 0 right), 3rd Conc Rd (0 left, 0 right), 2nd Conc Rd (0 left, 0 right).

Appendix E

Synchro Operational Reports



AM - Existing (2024)

Nyon Marine Fuelling Corp Phase 1 TIS

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	500	430	137	447	2	514	3	179	2	4	10
Future Volume (vph)	4	500	430	137	447	2	514	3	179	2	4	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1390	0
Flt Permitted	0.474			0.190			0.748			0.611		
Satd. Flow (perm)	830	3167	1340	292	3105	0	1234	1395	0	1069	1390	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			467					195			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	4	543	467	149	486	2	559	3	195	2	4	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	543	467	149	488	0	559	198	0	2	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

AM - Existing (2024)

Nyon Marine Fuelling Corp Phase 1 TIS

															
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA				
Protected Phases	7	4		3	8			2			6				
Permitted Phases	4		4	8			2			6					
Detector Phase	7	4	4	3	8		2	2		6	6				
Switch Phase															
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0				
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0				
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9				
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%				
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9				
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0				
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0				
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0				
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0				
Lead/Lag	Lead	Lag	Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes										
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0				
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max				
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0				
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0				
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0				
Act Effct Green (s)	31.1	26.1	26.1	40.0	38.2		64.9	64.9		64.9	64.9				
Actuated g/C Ratio	0.28	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57				
v/c Ratio	0.02	0.74	0.70	0.73	0.46		0.79	0.22		0.00	0.02				
Control Delay	24.2	47.5	9.7	48.3	31.8		28.6	2.3		10.5	6.1				
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0				
Total Delay	24.2	47.5	9.7	48.3	31.8		28.6	2.3		10.5	6.1				
LOS	C	D	A	D	C		C	A		B	A				
Approach Delay		30.0			35.6			21.7			6.6				
Approach LOS		C			D			C			A				
Queue Length 50th (m)	0.6	62.0	0.0	24.7	45.3		95.5	0.3		0.2	0.4				
Queue Length 95th (m)	3.2	82.4	32.5	#44.9	69.3		151.7	10.2		1.3	3.4				
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8				
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0					
Base Capacity (vph)	265	731	669	206	1050		709	884		614	803				
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	0.02	0.74	0.70	0.72	0.46		0.79	0.22		0.00	0.02				

Intersection Summary

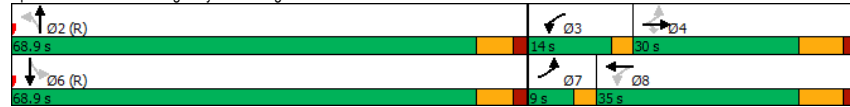
Area Type:	Other
Cycle Length:	112.9
Actuated Cycle Length:	112.9
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.79
Intersection Signal Delay:	28.7

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

Intersection Capacity Utilization 77.1%
ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

	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 (vph)	4	500	430	137	447	2	514	3	179	2	4	10
Future Volume (vph)	4	500	430	137	447	2	514	3	179	2	4	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1390	
Flt Permitted	0.47	1.00	1.00	0.19	1.00		0.75	1.00		0.61	1.00	
Satd. Flow (perm)	830	3167	1340	292	3106		1233	1395		1069	1390	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	543	467	149	486	2	559	3	195	2	4	11
RTOR Reduction (vph)	0	0	349	0	0	0	0	87	0	0	5	0
Lane Group Flow (vph)	4	543	118	149	488	0	559	111	0	2	10	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.8	24.6	24.6	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.8	28.5	28.5	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	799	338	199	1050		682	772		591	769	
v/s Ratio Prot	0.00	0.17		c0.07	0.16			0.08			0.01	
v/s Ratio Perm	0.00		0.09	c0.18			c0.45			0.00		
v/c Ratio	0.02	0.68	0.35	0.75	0.46		0.82	0.14		0.00	0.01	
Uniform Delay, d1	35.2	38.1	34.6	29.5	29.3		20.6	12.2		11.3	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	4.6	2.8	15.1	1.5		10.6	0.4		0.0	0.0	
Delay (s)	35.3	42.7	37.4	44.6	30.8		31.2	12.6		11.3	11.4	
Level of Service	D	D	D	D	C		C	B		B	B	
Approach Delay (s)		40.2			34.0			26.3			11.4	
Approach LOS		D			C			C			B	
Intersection Summary												
HCM 2000 Control Delay		34.1								C		
HCM 2000 Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		77.1%								D		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	1	0	477	318	2
Future Volume (vph)	0	1	0	477	318	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.850
Fit Protected						
Satd. Flow (prot)	1514	0	0	1620	1562	1488
Fit Permitted						
Satd. Flow (perm)	1514	0	0	1620	1562	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	8%	12%	0%
Adj. Flow (vph)	0	1	0	518	346	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	518	346	2
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 37.3%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	1	0	477	318	2
Future Volume (Veh/h)	0	1	0	477	318	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	518	346	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	864	346	348			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864	346	348			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	327	702	1222			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	1	518	346	2
Volume Left	0	0	0	0
Volume Right	1	0	0	2
cSH	702	1222	1700	1700
Volume to Capacity	0.00	0.00	0.20	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	10.1	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.1	0.0	0.0	
Approach LOS	B			

Intersection Summary

Average Delay	0.0
Intersection Capacity Utilization	37.3%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings

4: Highway 140 & Forks Road

AM - Existing (2024)

Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	5	1	1	2	0	7	3	472	3	1	305	3
Future Volume (vph)	5	1	1	2	0	7	3	472	3	1	305	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.981			0.892				0.850			0.850
Flt Protected		0.966			0.990							
Satd. Flow (prot)	0	1342	0	0	1545	0	0	1606	1488	0	1563	1488
Flt Permitted		0.966			0.990							
Satd. Flow (perm)	0	1342	0	0	1545	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			922.6
Travel Time (s)		83.0			10.0				123.3			66.4
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	5	1	1	2	0	8	3	513	3	1	332	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	0	0	10	0	0	516	3	0	333	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Area Type:	Other	
Control Type:	Unsignalized	
Intersection Capacity Utilization	43.8%	ICU Level of Service A
Analysis Period (min)	15	

HCM Unsignalized Intersection Capacity Analysis

4: Highway 140 & Forks Road

AM - Existing (2024)

Nyon Marine Fuelling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	5	1	1	2	0	7	3	472	3	1	305	3
Future Volume (Veh/h)	5	1	1	2	0	7	3	472	3	1	305	3
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
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
Hourly flow rate (vph)	5	1	1	2	0	8	3	513	3	1	332	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None		None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	861	856	332	854	856	513	335			516		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	861	856	332	854	856	513	335			516		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	99	100	99	100			100		
cM capacity (veh/h)	240	296	714	279	296	565	1236			1060		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	7	10	516	3	333	3						
Volume Left	5	2	3	0	1	0						
Volume Right	1	8	0	3	0	3						
cSH	273	469	1236	1700	1060	1700						
Volume to Capacity	0.03	0.02	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	0.6	0.5	0.1	0.0	0.0	0.0						
Control Delay (s)	18.5	12.8	0.1	0.0	0.0	0.0						
Lane LOS	C	B	A	A								
Approach Delay (s)	18.5	12.8	0.1	0.0								
Approach LOS	C	B										
Intersection Summary												
Average Delay	0.4											
Intersection Capacity Utilization	43.8%			ICU Level of Service					A			
Analysis Period (min)	15											

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	4	8	0	2	2	467	2	1	308	0
Future Volume (vph)	1	0	4	8	0	2	2	467	2	1	308	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.892			0.975				0.850			
Flt Protected		0.990			0.961							
Satd. Flow (prot)	0	1545	0	0	1591	0	0	1606	1118	0	1559	1750
Flt Permitted		0.990			0.961							
Satd. Flow (perm)	0	1545	0	0	1591	0	0	1606	1118	0	1559	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	4	9	0	2	2	508	2	1	335	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	11	0	0	510	2	0	336	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	38.4%
Analysis Period (min)	15
ICU Level of Service A	

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	4	8	0	2	2	467	2	1	308	0
Future Volume (Veh/h)	1	0	4	8	0	2	2	467	2	1	308	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	4	9	0	2	2	508	2	1	335	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	851	851	335	853	849	508	335			510		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	851	851	335	853	849	508	335			510		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	100	100	99	97	100	100	100			100		
cM capacity (veh/h)	281	298	712	279	299	536	1236			697		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	11	510	2	336	0
Volume Left	1	9	2	0	1	0
Volume Right	4	2	0	2	0	0
cSH	544	306	1236	1700	697	1700
Volume to Capacity	0.01	0.04	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.2	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	11.7	17.2	0.0	0.0	0.0	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	11.7	17.2	0.0	0.0		
Approach LOS	B	C				

Intersection Summary					
Average Delay		0.3			
Intersection Capacity Utilization	38.4%		ICU Level of Service	A	
Analysis Period (min)		15			

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Existing (2024)
Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	15	6	0	26	9	19	3	435	24	27	277	19	
Future Volume (vph)	15	6	0	26	9	19	3	435	24	27	277	19	
Ideal Flow (vphpl)	1750	1750		1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			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					0.952				0.850			0.850	
Flt Protected	0.966				0.977		0.950			0.950			
Satd. Flow (prot)	0	1295	0	0	1274	0	1662	1636	1305	1087	1606	1118	
Flt Permitted	0.837				0.837		0.577			0.476			
Satd. Flow (perm)	0	1122	0	0	1091	0	1010	1636	1305	544	1606	1118	
Right Turn on Red	Yes				Yes			Yes			Yes		
Satd. Flow (RTOR)					21				39			39	
Link Speed (k/h)	50				50			50			50		
Link Distance (m)	388.1				2359.9			455.1			2151.0		
Travel Time (s)	27.9				169.9			32.8			154.9		
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Adj. Flow (vph)	16	7	0	28	10	21	3	473	26	29	301	21	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	23	0	0	59	0	3	473	26	29	301	21	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		

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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Existing (2024)
Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)	11.0	11.0											
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.3			12.3		55.7	55.7	55.7	55.7	55.7	55.7	
Actuated g/C Ratio		0.18			0.18		0.82	0.82	0.82	0.82	0.82	0.82	
v/c Ratio		0.11			0.28		0.00	0.35	0.02	0.07	0.23	0.02	
Control Delay		25.0			21.1		3.3	4.2	0.9	3.6	3.5	0.7	
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		25.0			21.1		3.3	4.2	0.9	3.6	3.5	0.7	
LOS		C			C		A	A	A	A	A	A	
Approach Delay		25.0			21.1			4.0			3.3		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		2.6			4.4		0.1	20.8	0.0	1.0	11.5	0.0	
Queue Length 95th (m)		8.6			14.2		0.8	37.7	1.4	3.4	21.8	1.0	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)		446			446		828	1342	1078	446	1318	924	
Starvation Cap Reductn		0			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.05			0.13		0.00	0.35	0.02	0.07	0.23	0.02	
Intersection Summary													
Area Type:		Other											
Cycle Length: 83													
Actuated Cycle Length: 67.9													
Natural Cycle: 50													
Control Type: Actuated-Uncoordinated													
Maximum v/c Ratio: 0.35													
Intersection Signal Delay: 5.4													
Intersection Capacity Utilization 43.3%													
ICU Level of Service A													
Analysis Period (min) 15													

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 6: Highway 140 & Concession 2 Road

52 s	31 s
52 s	31 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

AM - Existing (2024)
Nyon Marine Fuelling Corp Phase 1 TIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↕		↖	↗	↖	↖	↗	↗
Traffic Volume (vph)	15	6	0	26	9	19	3	435	24	27	277	19
Future Volume (vph)	15	6	0	26	9	19	3	435	24	27	277	19
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1295			1274		1662	1636	1305	1087	1606	1118
Flt Permitted		0.84			0.84		0.58	1.00	1.00	0.48	1.00	1.00
Satd. Flow (perm)		1122			1092		1009	1636	1305	545	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	7	0	28	10	21	3	473	26	29	301	21
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	6	0	0	5
Lane Group Flow (vph)	0	23	0	0	40	0	3	473	20	29	301	16
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.2			6.2		51.1	51.1	51.1	51.1	51.1	51.1
Effective Green, g (s)		8.2			8.2		54.1	54.1	54.1	54.1	54.1	54.1
Actuated g/C Ratio		0.12			0.12		0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		130			127		776	1258	1004	419	1235	860
v/s Ratio Prot								c0.29			0.19	
v/s Ratio Perm		0.02			c0.04		0.00		0.02	0.05		0.01
v/c Ratio		0.18			0.32		0.00	0.38	0.02	0.07	0.24	0.02
Uniform Delay, d1		28.0			28.5		1.9	2.6	1.9	2.0	2.3	1.9
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.7			1.5		0.0	0.9	0.0	0.3	0.5	0.0
Delay (s)		28.7			29.9		1.9	3.5	1.9	2.3	2.8	1.9
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		28.7			29.9			3.4			2.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.4		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			70.3		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			43.3%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

1: Highway 140 & Regional Road 27

PM-Existing (2024)

Nyon Marine Fueling Corp Phase 1 TIS

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	570	536	191	650	4	484	3	174	0	2	16
Future Volume (vph)	11	570	536	191	650	4	484	3	174	0	2	16
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.866	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1375	0	1750	1398	0
Flt Permitted	0.331			0.233			0.745					
Satd. Flow (perm)	552	3197	1430	396	3164	0	1241	1375	0	1750	1398	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			583		1			189			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			3375.6			350.8	
Travel Time (s)		80.9			139.5			243.0			25.3	
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	12	620	583	208	707	4	526	3	189	0	2	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	620	583	208	711	0	526	192	0	0	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

1: Highway 140 & Regional Road 27

PM-Existing (2024)

Nyon Marine Fueling Corp Phase 1 TIS

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	7	4		3	8			2			6		
Permitted Phases	4		4	8			2			6			
Detector Phase	7	4	4	3	8		2	2		6	6		
Switch Phase													
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0		
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0		
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9		
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%		
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9		
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0		
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0		
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0		
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
Lead/Lag	Lead	Lag	Lag	Lead	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0		
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max		
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0		
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0		
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0		
Act Effct Green (s)	41.0	36.0	36.0	49.0	47.2		55.9	55.9			55.9		
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.42		0.50	0.50			0.50		
v/c Ratio	0.05	0.61	0.68	0.78	0.54		0.86	0.25			0.03		
Control Delay	19.1	35.6	7.1	43.2	27.1		40.7	3.2			7.0		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0		
Total Delay	19.1	35.6	7.1	43.2	27.1		40.7	3.2			7.0		
LOS	B	D	A	D	C		D	A			A		
Approach Delay		21.7			30.7			30.7			7.0		
Approach LOS		C			C			C			A		
Queue Length 50th (m)	1.6	63.8	0.0	30.8	62.0		103.6	0.4			0.3		
Queue Length 95th (m)	5.3	83.5	30.0	#60.0	92.8		#173.3	12.2			4.2		
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8		
Turn Bay Length (m)	130.0		100.0	180.0			300.0						
Base Capacity (vph)	246	1019	853	268	1323		614	776			700		
Starvation Cap Reductn	0	0	0	0	0		0	0			0		
Spillback Cap Reductn	0	0	0	0	0		0	0			0		
Storage Cap Reductn	0	0	0	0	0		0	0			0		
Reduced v/c Ratio	0.05	0.61	0.68	0.78	0.54		0.86	0.25			0.03		

Intersection Summary

Area Type:	Other
Cycle Length:	112.9
Actuated Cycle Length:	112.9
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	26.8

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

PM-Existing (2024)
Nyon Marine Fueling Corp Phase 1 TIS

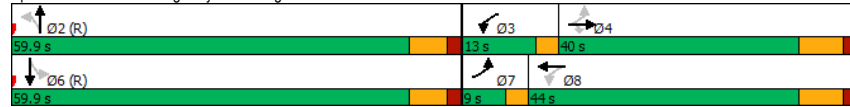
Intersection Capacity Utilization 87.5% ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

PM-Existing (2024)
Nyon Marine Fueling Corp Phase 1 TIS

	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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	11	570	536	191	650	4	484	3	174	0	2	16
Future Volume (vph)	11	570	536	191	650	4	484	3	174	0	2	16
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1375				
Flt Permitted	0.33	1.00	1.00	0.23	1.00		0.75	1.00				
Satd. Flow (perm)	551	3197	1430	397	3165		1241	1375				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	620	583	208	707	4	526	3	189	0	2	17
RTOR Reduction (vph)	0	0	385	0	1	0	0	99	0	0	9	0
Lane Group Flow (vph)	12	620	198	208	710	0	526	93	0	0	10	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	35.7	34.5	34.5	47.5	43.3		50.5	50.5			50.5	
Effective Green, g (s)	33.7	38.4	38.4	46.5	47.2		53.5	53.5			53.5	
Actuated g/C Ratio	0.30	0.34	0.34	0.41	0.42		0.47	0.47			0.47	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	166	1087	486	260	1323		588	651			662	
v/s Ratio Prot	0.00	0.19		c0.06	0.22			0.07			0.01	
v/s Ratio Perm	0.02		0.14	c0.27			c0.42					
v/c Ratio	0.07	0.57	0.41	0.80	0.54		0.89	0.14			0.02	
Uniform Delay, d1	30.4	30.5	28.5	25.3	24.7		27.1	16.8			15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	2.2	2.5	16.8	1.6		18.6	0.5			0.0	
Delay (s)	30.6	32.7	31.1	42.1	26.2		45.8	17.2			15.8	
Level of Service	C	C	C	D	C		D	B			B	
Approach Delay (s)		31.9			29.8			38.1			15.8	
Approach LOS		C			C			D			B	
Intersection Summary												
HCM 2000 Control Delay		32.7										
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		112.9										
Intersection Capacity Utilization		87.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings

3: Highway 140 & Kleinsmith Road

PM-Existing (2024)

Nyon Marine Fueling Corp Phase 1 TIS

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	392	500	2
Future Volume (vph)	1	0	0	392	500	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.850	
Flt Protected	0.950					
Satd. Flow (prot)	1662	0	0	1683	1716	1488
Flt Permitted	0.950					
Satd. Flow (perm)	1662	0	0	1683	1716	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	2%	0%
Adj. Flow (vph)	1	0	0	426	543	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	426	543	2
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 38.6%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis

3: Highway 140 & Kleinsmith Road

PM-Existing (2024)

Nyon Marine Fueling Corp Phase 1 TIS

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	392	500	2
Future Volume (Veh/h)	1	0	0	392	500	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	426	543	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	969	543	545			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	969	543	545			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	284	544	1034			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	426	543	2		
Volume Left	1	0	0	0		
Volume Right	0	0	0	2		
cSH	284	1034	1700	1700		
Volume to Capacity	0.00	0.00	0.32	0.00		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	17.7	0.0	0.0	0.0		
Lane LOS	C					
Approach Delay (s)	17.7	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			38.6%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings

4: Highway 140 & Forks Road

PM-Existing (2024)

Nyon Marine Fueling Corp Phase 1 TIS

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	6	7	3	5	5	405	6	4	418	7
Future Volume (vph)	7	0	6	7	3	5	5	405	6	4	418	7
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.937			0.958				0.850			0.850
Flt Protected		0.974			0.976			0.999				
Satd. Flow (prot)	0	1597	0	0	1636	0	0	1682	1488	0	1697	1488
Flt Permitted		0.974			0.976			0.999				
Satd. Flow (perm)	0	1597	0	0	1636	0	0	1682	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			922.6	
Travel Time (s)		83.0			10.0			123.3			66.4	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	8	0	7	8	3	5	5	440	7	4	454	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	16	0	0	445	7	0	458	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	40.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

4: Highway 140 & Forks Road

PM-Existing (2024)

Nyon Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	0	6	7	3	5	5	405	6	4	418	7
Future Volume (Veh/h)	7	0	6	7	3	5	5	405	6	4	418	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	0	7	8	3	5	5	440	7	4	454	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	918	919	454	919	920	440	462			447		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	918	919	454	919	920	440	462			447		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	97	100	99	97	99	99	100			100		
cM capacity (veh/h)	248	271	610	249	271	621	1110			1038		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	16	445	7	458	8
Volume Left	8	8	5	0	4	0
Volume Right	7	5	0	7	0	8
cSH	343	312	1110	1700	1038	1700
Volume to Capacity	0.04	0.05	0.00	0.00	0.00	0.00
Queue Length 95th (m)	1.1	1.3	0.1	0.0	0.1	0.0
Control Delay (s)	16.0	17.1	0.1	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.0	17.1	0.1		0.1	
Approach LOS	C	C				

Intersection Summary					
Average Delay		0.7			
Intersection Capacity Utilization		40.8%	ICU Level of Service	A	
Analysis Period (min)		15			

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

PM-Existing (2024)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	3	1	1	2	0	3	3	419	8	5	426	2
Future Volume (vph)	3	1	1	2	0	3	3	419	8	5	426	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.973			0.919				0.850			0.850
Flt Protected		0.971			0.980						0.999	
Satd. Flow (prot)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Flt Permitted		0.971			0.980						0.999	
Satd. Flow (perm)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	3	1	1	2	0	3	3	455	9	5	463	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	5	0	0	458	9	0	468	2
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Area Type:	Other	
Control Type:	Unsignalized	
Intersection Capacity Utilization	41.3%	ICU Level of Service A
Analysis Period (min)	15	

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

PM-Existing (2024)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	3	1	1	2	0	3	3	419	8	5	426	2
Future Volume (Veh/h)	3	1	1	2	0	3	3	419	8	5	426	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	1	1	2	0	3	3	455	9	5	463	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	937	943	463	936	936	455	465			464		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	937	943	463	936	936	455	465			464		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	100	99	100	100	100			100		
cM capacity (veh/h)	244	263	603	214	265	609	1107			1108		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	458	9	468	2
Volume Left	3	2	3	0	5	0
Volume Right	1	3	0	9	0	2
cSH	282	351	1107	1700	1108	1700
Volume to Capacity	0.02	0.01	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.4	0.3	0.1	0.0	0.1	0.0
Control Delay (s)	18.0	15.4	0.1	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.0	15.4	0.1	0.1		
Approach LOS	C	C				

Intersection Summary					
Average Delay		0.3			
Intersection Capacity Utilization		41.3%	ICU Level of Service	A	
Analysis Period (min)		15			

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM-Existing (2024)
Nyron Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	21	6	4	50	10	15	0	392	42	19	385	23	
Future Volume (vph)	21	6	4	50	10	15	0	392	42	19	385	23	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			7.5			7.5			
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	
Ped Bike Factor		1.00			1.00								
Frt		0.984			0.973				0.850			0.850	
Flt Protected		0.967			0.968				0.950				
Satd. Flow (prot)	0	1502	0	0	1609	0	1716	1681	1400	1395	1709	1458	
Flt Permitted		0.827			0.779				0.497				
Satd. Flow (perm)	0	1283	0	0	1295	0	1716	1681	1400	730	1709	1458	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		4			16				46			39	
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		388.1			2359.9			455.1			2151.0		
Travel Time (s)		27.9			169.9			32.8			154.9		
Confl. Peds. (#/hr)	1					1							
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	
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0	
Adj. Flow (vph)	23	7	4	54	11	16	0	426	46	21	418	25	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	34	0	0	81	0	0	426	46	21	418	25	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM-Existing (2024)
Nyron Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4			8			2		6		6	
Permitted Phases	4			8			2	2	2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)				11.0	11.0								
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.5			12.5			51.9	51.9	51.9	51.9	51.9	
Actuated g/C Ratio		0.18			0.18			0.76	0.76	0.76	0.76	0.76	
v/c Ratio		0.14			0.32			0.33	0.04	0.04	0.32	0.02	
Control Delay		23.0			24.3			4.7	1.3	3.6	4.6	1.0	
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0	
Total Delay		23.0			24.3			4.7	1.3	3.6	4.6	1.0	
LOS		C			C			A	A	A	A	A	
Approach Delay		23.0			24.3			4.4			4.4		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		3.4			7.6			17.8	0.0	0.7	17.2	0.0	
Queue Length 95th (m)		10.6			19.2			34.5	2.6	2.8	33.2	1.4	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)								190.0	55.0			15.0	
Base Capacity (vph)		509			521			1276	1074	554	1298	1116	
Starvation Cap Reductn		0			0			0	0	0	0	0	
Spillback Cap Reductn		0			0			0	0	0	0	0	
Storage Cap Reductn		0			0			0	0	0	0	0	
Reduced v/c Ratio		0.07			0.16			0.33	0.04	0.04	0.32	0.02	
Intersection Summary													
Area Type:		Other											
Cycle Length:		83											
Actuated Cycle Length:		68.3											
Natural Cycle:		50											
Control Type:		Actuated-Uncoordinated											
Maximum v/c Ratio:		0.33											
Intersection Signal Delay:		6.5											
Intersection Capacity Utilization		43.3%											
								Intersection LOS:	A				
								ICU Level of Service	A				

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM-Existing (2024)
Nyon Marine Fueling Corp Phase 1 TIS

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

PM-Existing (2024)
Nyon Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	6	4	50	10	15	0	392	42	19	385	23
Future Volume (vph)	21	6	4	50	10	15	0	392	42	19	385	23
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1501			1609			1681	1400	1395	1709	1458
Flt Permitted		0.83			0.78			1.00	1.00	0.50	1.00	1.00
Satd. Flow (perm)		1284			1295			1681	1400	729	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	7	4	54	11	16	0	426	46	21	418	25
RTOR Reduction (vph)	0	3	0	0	14	0	0	0	12	0	0	7
Lane Group Flow (vph)	0	31	0	0	67	0	0	426	34	21	418	18
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.5			8.5			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.5			10.5			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		193			195			1234	1027	535	1254	1070
v/s Ratio Prot								0.25			0.24	
v/s Ratio Perm		0.02			0.05				0.02	0.03		0.01
v/c Ratio		0.16			0.35			0.35	0.03	0.04	0.33	0.02
Uniform Delay, d1		25.7			26.5			3.3	2.5	2.5	3.3	2.5
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4			1.1			0.8	0.1	0.1	0.7	0.0
Delay (s)		26.1			27.5			4.1	2.6	2.7	4.0	2.5
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.1			27.5			3.9			3.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.4			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.35										
Actuated Cycle Length (s)		69.6			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		43.3%			ICU Level of Service				A			
Analysis Period (min)		15										

c Critical Lane Group

Junctions 8
ARCADY 8 - Roundabout Module
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:37:59 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - Base Year (2024)						
Leg North	0.77	1.12	6.04	0.41	A	6.37	A
Leg West	0.19	~1	4.66	0.15	A		
Leg South	1.04	1.08	7.20	0.49	A		
Leg East	0.08	~1	5.56	0.07	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:37:59 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - Base Year (2024), AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Base Year (2024), AM	Base Year (2024)	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				6.37	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	419.00	100.000
West	ONE HOUR	✓	131.00	100.000
South	ONE HOUR	✓	477.00	100.000
East	ONE HOUR	✓	49.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	99.000	280.000	40.000
	West	98.000	0.000	31.000	2.000
	South	430.000	27.000	0.000	20.000
	East	40.000	0.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.24	0.67	0.10
	West	0.75	0.00	0.24	0.02
	South	0.90	0.06	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.41	6.04	0.77	1.12	A	384.48	576.72	52.35	5.45	0.58	52.36	5.45
West	0.15	4.66	0.19	~1	A	120.21	180.31	13.11	4.36	0.15	13.11	4.36
South	0.49	7.20	1.04	1.08	A	437.70	656.56	67.75	6.19	0.75	67.76	6.19
East	0.07	5.56	0.08	~1	A	44.96	67.44	5.78	5.14	0.06	5.78	5.14

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	315.45	78.86	313.74	425.24	26.95	0.00	1138.23	1081.54	0.277	0.00	0.43	4.896	A
West	98.62	24.66	98.18	94.34	246.35	0.00	1011.25	630.20	0.098	0.00	0.11	4.081	A
South	359.11	89.78	357.02	239.63	104.90	0.00	1093.12	815.65	0.329	0.00	0.52	5.265	A
East	36.89	9.22	36.70	46.42	415.49	0.00	913.36	428.70	0.040	0.00	0.05	4.736	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	376.67	94.17	376.17	509.85	32.31	0.00	1135.13	1081.53	0.332	0.43	0.55	5.325	A
West	117.77	29.44	117.65	113.11	295.37	0.00	982.88	630.20	0.120	0.11	0.14	4.309	A

South	428.81	107.20	428.10	287.30	125.72	0.00	1081.07	815.65	0.397	0.52	0.70	5.946	A
East	44.05	11.01	44.00	55.66	498.16	0.00	865.51	428.70	0.051	0.05	0.06	5.055	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	461.33	115.33	460.48	623.97	39.55	0.00	1130.94	1081.53	0.408	0.55	0.77	6.025	A
West	144.23	36.06	144.05	138.45	361.57	0.00	944.57	630.20	0.153	0.14	0.19	4.656	A
South	525.19	131.30	523.86	351.70	153.92	0.00	1064.74	815.65	0.493	0.70	1.04	7.168	A
East	53.95	13.49	53.86	68.12	609.66	0.00	800.98	428.70	0.067	0.06	0.08	5.558	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	461.33	115.33	461.31	625.35	39.63	0.00	1130.89	1081.53	0.408	0.77	0.77	6.040	A
West	144.23	36.06	144.23	138.72	362.22	0.00	944.19	630.20	0.153	0.19	0.19	4.660	A
South	525.19	131.30	525.16	352.31	154.14	0.00	1064.62	815.65	0.493	1.04	1.04	7.204	A
East	53.95	13.49	53.95	68.26	611.03	0.00	800.19	428.70	0.067	0.08	0.08	5.564	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	376.67	94.17	377.50	511.99	32.45	0.00	1135.05	1081.53	0.332	0.77	0.56	5.346	A
West	117.77	29.44	117.94	113.54	296.41	0.00	982.28	630.20	0.120	0.19	0.14	4.315	A
South	428.81	107.20	430.11	288.28	126.07	0.00	1080.86	815.65	0.397	1.04	0.72	5.984	A
East	44.05	11.01	44.13	55.87	500.31	0.00	864.27	428.70	0.051	0.08	0.06	5.065	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	315.45	78.86	315.96	428.42	27.15	0.00	1138.11	1081.54	0.277	0.56	0.43	4.924	A
West	98.62	24.66	98.74	95.02	248.09	0.00	1010.24	630.20	0.098	0.14	0.11	4.090	A
South	359.11	89.78	359.85	241.29	105.54	0.00	1092.75	815.65	0.329	0.72	0.53	5.308	A
East	36.89	9.22	36.94	46.76	418.63	0.00	911.54	428.70	0.040	0.06	0.05	4.750	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.23	0.42	4.896	A	A
West	1.63	0.11	4.081	A	A
South	7.60	0.51	5.265	A	A
East	0.71	0.05	4.736	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.12	0.54	5.325	A	A
West	2.07	0.14	4.309	A	A
South	10.27	0.68	5.946	A	A
East	0.91	0.06	5.055	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.18	0.75	6.025	A	A
West	2.74	0.18	4.656	A	A
South	15.00	1.00	7.168	A	A

East	1.22	0.08	5.558	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.52	0.77	6.040	A	A
West	2.79	0.19	4.660	A	A
South	15.60	1.04	7.204	A	A
East	1.24	0.08	5.564	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.65	0.58	5.346	A	A
West	2.16	0.14	4.315	A	A
South	11.09	0.74	5.984	A	A
East	0.95	0.06	5.065	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.64	0.44	4.924	A	A
West	1.71	0.11	4.090	A	A
South	8.19	0.55	5.308	A	A
East	0.75	0.05	4.750	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.55	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.77	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

South	1.04	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.77	0.00	0.00	0.00	1.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.04	0.00	0.00	0.00	1.08			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.72	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.43	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:38:55 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - Base Year (2024)						
Leg North	1.35	1.03	7.67	0.57	A	6.65	A
Leg West	0.19	~1	5.23	0.15	A		
Leg South	0.69	1.05	5.76	0.40	A		
Leg East	0.08	~1	5.17	0.06	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:38:55 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - Base Year (2024), PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
Base Year (2024), PM	Base Year (2024)	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				6.65	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	583.00	100.000
West	ONE HOUR	✓	117.00	100.000
South	ONE HOUR	✓	393.00	100.000
East	ONE HOUR	✓	51.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	106.000	448.000	29.000
	West	68.000	0.000	46.000	3.000
	South	322.000	37.000	0.000	34.000
	East	43.000	0.000	8.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.18	0.77	0.05
	West	0.58	0.00	0.39	0.03
	South	0.82	0.09	0.00	0.09
	East	0.84	0.00	0.16	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.57	7.67	1.35	1.03	A	534.97	802.46	85.82	6.42	0.95	85.83	6.42
West	0.15	5.23	0.19	~1	A	107.36	161.04	12.85	4.79	0.14	12.85	4.79
South	0.40	5.76	0.69	1.05	A	360.62	540.94	46.69	5.18	0.52	46.69	5.18
East	0.06	5.17	0.08	~1	A	46.80	70.20	5.70	4.87	0.06	5.70	4.87

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	438.91	109.73	436.34	324.33	33.70	0.00	1134.32	1061.75	0.387	0.00	0.64	5.293	A
West	88.08	22.02	87.66	107.05	363.00	0.00	943.74	608.54	0.093	0.00	0.11	4.369	A
South	295.87	73.97	294.35	375.75	74.90	0.00	1110.48	909.53	0.266	0.00	0.38	4.633	A
East	38.40	9.60	38.20	49.42	319.83	0.00	968.72	468.27	0.040	0.00	0.05	4.587	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	524.11	131.03	523.16	388.78	40.40	0.00	1130.44	1061.75	0.464	0.64	0.88	6.095	A
West	105.18	26.30	105.06	128.34	435.23	0.00	901.94	608.54	0.117	0.11	0.14	4.696	A

South	353.30	88.32	352.85	450.51	89.78	0.00	1101.87	909.53	0.321	0.38	0.49	5.053	A
East	45.85	11.46	45.80	59.24	383.38	0.00	931.94	468.27	0.049	0.05	0.06	4.818	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	641.89	160.47	640.04	475.93	49.46	0.00	1125.20	1061.75	0.570	0.88	1.34	7.613	A
West	128.82	32.20	128.62	157.04	532.47	0.00	845.66	608.54	0.152	0.14	0.19	5.218	A
South	432.70	108.18	431.93	551.20	109.89	0.00	1090.23	909.53	0.397	0.49	0.69	5.746	A
East	56.15	14.04	56.08	72.50	469.32	0.00	882.21	468.27	0.064	0.06	0.08	5.168	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	641.89	160.47	641.84	476.73	49.54	0.00	1125.15	1061.75	0.571	1.34	1.35	7.668	A
West	128.82	32.20	128.82	157.44	533.95	0.00	844.80	608.54	0.152	0.19	0.19	5.226	A
South	432.70	108.18	432.69	552.67	110.10	0.00	1090.11	909.53	0.397	0.69	0.69	5.761	A
East	56.15	14.04	56.15	72.66	470.12	0.00	881.74	468.27	0.064	0.08	0.08	5.171	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	524.11	131.03	525.92	390.05	40.54	0.00	1130.37	1061.75	0.464	1.35	0.90	6.154	A
West	105.18	26.30	105.37	128.95	437.50	0.00	900.62	608.54	0.117	0.19	0.14	4.706	A
South	353.30	88.32	354.05	452.77	90.10	0.00	1101.68	909.53	0.321	0.69	0.50	5.073	A
East	45.85	11.46	45.92	59.49	384.66	0.00	931.20	468.27	0.049	0.08	0.06	4.823	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	438.91	109.73	439.89	326.48	33.93	0.00	1134.19	1061.75	0.387	0.90	0.66	5.347	A
West	88.08	22.02	88.21	107.88	365.94	0.00	942.04	608.54	0.094	0.14	0.11	4.384	A
South	295.87	73.97	296.33	378.74	75.41	0.00	1110.19	909.53	0.267	0.50	0.38	4.658	A
East	38.40	9.60	38.45	49.78	321.96	0.00	967.49	468.27	0.040	0.06	0.05	4.597	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.33	0.62	5.293	A	A
West	1.56	0.10	4.369	A	A
South	5.54	0.37	4.633	A	A
East	0.71	0.05	4.587	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.83	0.86	6.095	A	A
West	2.01	0.13	4.696	A	A
South	7.24	0.48	5.053	A	A
East	0.90	0.06	4.818	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.33	1.29	7.613	A	A
West	2.73	0.18	5.218	A	A
South	10.02	0.67	5.746	A	A

East	1.18	0.08	5.168	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	20.25	1.35	7.668	A	A
West	2.79	0.19	5.226	A	A
South	10.31	0.69	5.761	A	A
East	1.20	0.08	5.171	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.98	0.93	6.154	A	A
West	2.11	0.14	4.706	A	A
South	7.69	0.51	5.073	A	A
East	0.94	0.06	4.823	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.10	0.67	5.347	A	A
West	1.64	0.11	4.384	A	A
South	5.89	0.39	4.658	A	A
East	0.75	0.05	4.597	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.64	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.88	0.00	0.00	0.00	1.03			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.49	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.34	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
						Percentiles could not be calculated. This may			

South	0.69	~1	~1	~1	~1	be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.69	0.00	0.00	0.00	1.05			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.90	0.00	0.00	0.00	1.03			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.38	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2026)

Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	4	520	447	142	465	2	535	3	186	2	4	10
Future Volume (vph)	4	520	447	142	465	2	535	3	186	2	4	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1390	0
Flt Permitted	0.465			0.172			0.748			0.604		
Satd. Flow (perm)	814	3167	1340	264	3105	0	1234	1395	0	1057	1390	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			486					202			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	4	565	486	154	505	2	582	205	3	202	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	565	486	154	507	0	582	205	0	2	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2026)

Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.02	0.78	0.71	0.77	0.48		0.82	0.23		0.00	0.02	
Control Delay	24.2	49.0	9.9	53.8	32.1		31.1	2.3		10.5	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.2	49.0	9.9	53.8	32.1		31.1	2.3		10.5	6.1	
LOS	C	D	A	D	C		C	A		B	A	
Approach Delay		30.9			37.1			23.6			6.6	
Approach LOS		C			D			C			A	
Queue Length 50th (m)	0.6	65.0	0.0	25.6	47.4		102.9	0.3		0.2	0.4	
Queue Length 95th (m)	3.2	86.1	33.7	#51.3	72.2		#179.3	10.3		1.3	3.4	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	261	729	682	199	1050		709	887		607	803	
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	0.02	0.78	0.71	0.77	0.48		0.82	0.23		0.00	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.82

Intersection Signal Delay: 30.1

Intersection LOS: C

PTSL 200364

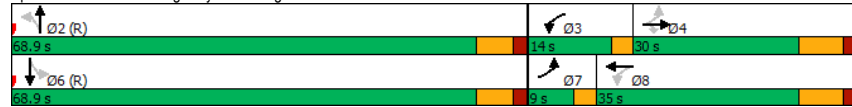
Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

Intersection Capacity Utilization 78.6%
ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	4	520	447	142	465	2	535	3	186	2	4	10
Future Volume (vph)	4	520	447	142	465	2	535	3	186	2	4	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1390	
Flt Permitted	0.47	1.00	1.00	0.17	1.00		0.75	1.00		0.60	1.00	
Satd. Flow (perm)	815	3167	1340	265	3106		1233	1395		1058	1390	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	565	486	154	505	2	582	3	202	2	4	11
RTOR Reduction (vph)	0	0	364	0	0	0	0	90	0	0	5	0
Lane Group Flow (vph)	4	565	122	154	507	0	582	115	0	2	10	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	172	796	337	193	1050		682	772		585	769	
v/s Ratio Prot	0.00	0.18		c0.07	0.16			0.08			0.01	
v/s Ratio Perm	0.00		0.09	c0.19			c0.47			0.00		
v/c Ratio	0.02	0.71	0.36	0.80	0.48		0.85	0.15		0.00	0.01	
Uniform Delay, d1	35.3	38.5	34.8	29.8	29.5		21.3	12.3		11.3	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	5.3	3.0	21.1	1.6		12.9	0.4		0.0	0.0	
Delay (s)	35.4	43.8	37.8	50.9	31.1		34.2	12.7		11.3	11.4	
Level of Service	D	D	D	D	C		C	B		B	B	
Approach Delay (s)		41.0			35.7			28.6			11.4	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM 2000 Control Delay		35.5										
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		78.6%								D		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	1	0	496	331	2
Future Volume (vph)	0	1	0	496	331	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.850
Fit Protected						
Satd. Flow (prot)	1514	0	0	1620	1562	1488
Fit Permitted						
Satd. Flow (perm)	1514	0	0	1620	1562	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	8%	12%	0%
Adj. Flow (vph)	0	1	0	539	360	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	539	360	2
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 38.3%	ICU Level of Service A
Analysis Period (min) 15	

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	1	0	496	331	2
Future Volume (Veh/h)	0	1	0	496	331	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	539	360	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	899	360	362			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	899	360	362			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	312	689	1208			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	1	539	360	2
Volume Left	0	0	0	0
Volume Right	1	0	0	2
cSH	689	1208	1700	1700
Volume to Capacity	0.00	0.00	0.21	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	10.2	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.2	0.0	0.0	
Approach LOS	B			

Intersection Summary

Average Delay	0.0			
Intersection Capacity Utilization	38.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	↔
Traffic Volume (vph)	5	1	1	2	0	7	3	491	3	1	317	3	
Future Volume (vph)	5	1	1	2	0	7	3	491	3	1	317	3	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (m)	7.5			7.5			7.5			7.5			
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		0.981			0.892				0.850			0.850	
Flt Protected		0.966			0.990								
Satd. Flow (prot)	0	1342	0	0	1545	0	0	1606	1488	0	1563	1488	
Flt Permitted		0.966			0.990								
Satd. Flow (perm)	0	1342	0	0	1545	0	0	1606	1488	0	1563	1488	
Link Speed (k/h)		50			50				50			50	
Link Distance (m)		1152.3			139.3				1712.9			922.6	
Travel Time (s)		83.0			10.0				123.3			66.4	
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%	
Adj. Flow (vph)	5	1	1	2	0	8	3	534	3	1	345	3	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	7	0	0	10	0	0	537	3	0	346	3	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0				0.0			0.0	
Link Offset(m)		0.0			0.0				0.0			0.0	
Crosswalk Width(m)		4.8			4.8				4.8			4.8	
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Sign Control		Stop			Stop			Free			Free		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 44.9%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	↔
Traffic Volume (veh/h)	5	1	1	2	0	7	3	491	3	1	317	3	
Future Volume (Veh/h)	5	1	1	2	0	7	3	491	3	1	317	3	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	5	1	1	2	0	8	3	534	3	1	345	3	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	895	890	345	888	890	534	348			537			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	895	890	345	888	890	534	348			537			
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)													
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	98	100	100	99	100	99	100			100			
cM capacity (veh/h)	227	283	702	265	283	550	1222			1041			

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	10	537	3	346	3
Volume Left	5	2	3	0	1	0
Volume Right	1	8	0	3	0	3
cSH	259	452	1222	1700	1041	1700
Volume to Capacity	0.03	0.02	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.7	0.5	0.1	0.0	0.0	0.0
Control Delay (s)	19.3	13.1	0.1	0.0	0.0	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	19.3	13.1	0.1	0.0		
Approach LOS	C	B				

Intersection Summary

Average Delay	0.4					
Intersection Capacity Utilization	44.9%	ICU Level of Service	A			
Analysis Period (min)	15					

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	1	0	4	8	0	2	2	486	2	1	320	0	
Future Volume (vph)	1	0	4	8	0	2	2	486	2	1	320	0	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (m)	7.5			7.5			7.5			7.5			
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	
Frt		0.892				0.975				0.850			
Flt Protected		0.990				0.961							
Satd. Flow (prot)	0	1545	0	0	1591	0	0	1606	1118	0	1559	1750	
Flt Permitted		0.990				0.961							
Satd. Flow (perm)	0	1545	0	0	1591	0	0	1606	1118	0	1559	1750	
Link Speed (k/h)		50				50			50		50		
Link Distance (m)		910.5				2029.2			2151.0		1712.9		
Travel Time (s)		65.6				146.1			154.9		123.3		
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%	
Adj. Flow (vph)	1	0	4	9	0	2	2	528	2	1	348	0	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	5	0	0	11	0	0	530	2	0	349	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Sign Control		Stop			Stop			Free			Free		

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 39.5%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	
Traffic Volume (veh/h)	1	0	4	8	0	2	2	486	2	1	320	0	
Future Volume (Veh/h)	1	0	4	8	0	2	2	486	2	1	320	0	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	1	0	4	9	0	2	2	528	2	1	348	0	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	884	884	348	886	882	528	348				530		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	884	884	348	886	882	528	348				530		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1				5.1		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2				3.1		
p0 queue free %	100	100	99	97	100	100	100				100		
cM capacity (veh/h)	267	286	700	265	286	522	1222				683		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	5	11	530	2	349	0	
Volume Left	1	9	2	0	1	0	
Volume Right	4	2	0	2	0	0	
cSH	528	291	1222	1700	683	1700	
Volume to Capacity	0.01	0.04	0.00	0.00	0.00	0.00	
Queue Length 95th (m)	0.2	0.9	0.0	0.0	0.0	0.0	
Control Delay (s)	11.9	17.8	0.0	0.0	0.0	0.0	
Lane LOS	B	C	A		A		
Approach Delay (s)	11.9	17.8	0.0		0.0		
Approach LOS	B	C					

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2026)
Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	16	6	0	27	9	20	3	452	25	28	288	20	
Future Volume (vph)	16	6	0	27	9	20	3	452	25	28	288	20	
Ideal Flow (vphpl)	1750	1750		1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			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					0.951				0.850			0.850	
Flt Protected	0.966				0.977		0.950			0.950			
Satd. Flow (prot)	0	1294	0	0	1270	0	1662	1636	1305	1087	1606	1118	
Flt Permitted	0.835				0.837		0.570			0.465			
Satd. Flow (perm)	0	1118	0	0	1088	0	998	1636	1305	532	1606	1118	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)					22				39			39	
Link Speed (k/h)	50				50				50			50	
Link Distance (m)	388.1				2359.9				455.1			2151.0	
Travel Time (s)	27.9				169.9				32.8			154.9	
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Adj. Flow (vph)	17	7	0	29	10	22	3	491	27	30	313	22	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	24	0	0	61	0	3	491	27	30	313	22	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0				3.6			3.6	
Link Offset(m)		0.0			0.0				0.0			0.0	
Crosswalk Width(m)		4.8			4.8				4.8			4.8	
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2				6	

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2026)
Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)	11.0	11.0											
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.3			12.3		55.7	55.7	55.7	55.7	55.7	55.7	
Actuated g/C Ratio		0.18			0.18		0.82	0.82	0.82	0.82	0.82	0.82	
v/c Ratio		0.12			0.28		0.00	0.37	0.03	0.07	0.24	0.02	
Control Delay		25.0			21.1		3.3	4.3	1.0	3.7	3.5	0.8	
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		25.0			21.1		3.3	4.3	1.0	3.7	3.5	0.8	
LOS		C			C		A	A	A	A	A	A	
Approach Delay		25.0			21.1			4.1			3.4		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		2.7			4.5		0.1	21.9	0.0	1.0	12.1	0.0	
Queue Length 95th (m)		8.8			14.4		0.8	40.2	1.4	3.6	23.0	1.1	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)		444			446		818	1342	1077	436	1317	924	
Starvation Cap Reductn		0			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.05			0.14		0.00	0.37	0.03	0.07	0.24	0.02	
Intersection Summary													
Area Type:		Other											
Cycle Length:		83											
Actuated Cycle Length:		67.9											
Natural Cycle:		50											
Control Type:		Actuated-Uncoordinated											
Maximum v/c Ratio:		0.37											
Intersection Signal Delay:		5.4							Intersection LOS: A				
Intersection Capacity Utilization		43.3%							ICU Level of Service A				
Analysis Period (min)		15											

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 6: Highway 140 & Concession 2 Road

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

AM - Background (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↕		↖	↗	↖	↖	↗	↗
Traffic Volume (vph)	16	6	0	27	9	20	3	452	25	28	288	20
Future Volume (vph)	16	6	0	27	9	20	3	452	25	28	288	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1293			1270		1662	1636	1305	1087	1606	1118
Flt Permitted		0.83			0.84		0.57	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)		1118			1088		998	1636	1305	532	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	7	0	29	10	22	3	491	27	30	313	22
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	6	0	0	5
Lane Group Flow (vph)	0	24	0	0	42	0	3	491	21	30	313	17
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.3			6.3		51.1	51.1	51.1	51.1	51.1	51.1
Effective Green, g (s)		8.3			8.3		54.1	54.1	54.1	54.1	54.1	54.1
Actuated g/C Ratio		0.12			0.12		0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		131			128		766	1257	1002	408	1234	859
v/s Ratio Prot								c0.30				0.19
v/s Ratio Perm		0.02			c0.04		0.00		0.02	0.06		0.02
v/c Ratio		0.18			0.32		0.00	0.39	0.02	0.07	0.25	0.02
Uniform Delay, d1		28.0			28.5		1.9	2.7	1.9	2.0	2.3	1.9
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.7			1.5		0.0	0.9	0.0	0.3	0.5	0.0
Delay (s)		28.7			30.0		1.9	3.6	2.0	2.3	2.8	2.0
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		28.7			30.0			3.5			2.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay				5.5	HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio				0.38								
Actuated Cycle Length (s)				70.4	Sum of lost time (s)				8.0			
Intersection Capacity Utilization				43.3%	ICU Level of Service				A			
Analysis Period (min)				15								
c Critical Lane Group												

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

PM - Background (2026)

Nyon Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↘	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖	↖↗		↖	↖		↖	↖	↖
Traffic Volume (vph)	11	593	557	199	676	4	503	3	181	0	2	17
Future Volume (vph)	11	593	557	199	676	4	503	3	181	0	2	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.865	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1375	0	1750	1396	0
Flt Permitted	0.312			0.219			0.744					
Satd. Flow (perm)	520	3197	1430	372	3164	0	1239	1375	0	1750	1396	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			605		1			197			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			3375.6			350.8	
Travel Time (s)		80.9			139.5			243.0			25.3	
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	12	645	605	216	735	4	547	3	197	0	2	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	645	605	216	739	0	547	200	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

PTSL (200364)

Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

PM - Background (2026)

Nyon Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↘	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9	
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	41.0	36.0	36.0	49.0	47.2		55.9	55.9			55.9	
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.42		0.50	0.50			0.50	
v/c Ratio	0.05	0.63	0.70	0.83	0.56		0.89	0.26			0.03	
Control Delay	19.1	36.2	7.3	50.0	27.5		45.0	3.2			6.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	19.1	36.2	7.3	50.0	27.5		45.0	3.2			6.8	
LOS	B	D	A	D	C		D	A			A	
Approach Delay		22.2			32.6			33.8			6.8	
Approach LOS		C			C			C			A	
Queue Length 50th (m)	1.6	67.0	0.0	32.2	65.2		111.1	0.4			0.3	
Queue Length 95th (m)	5.3	87.4	31.0	#67.3	97.3		#184.6	12.4			4.4	
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0					
Base Capacity (vph)	235	1019	868	260	1323		613	780			700	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.05	0.63	0.70	0.83	0.56		0.89	0.26			0.03	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.89

Intersection Signal Delay: 28.3

Intersection LOS: C

PTSL (200364)

Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

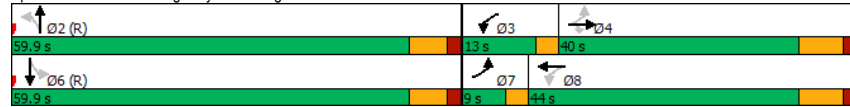
Intersection Capacity Utilization 89.4% ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	11	593	557	199	676	4	503	3	181	0	2	17
Future Volume (vph)	11	593	557	199	676	4	503	3	181	0	2	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1375				1396
Flt Permitted	0.31	1.00	1.00	0.22	1.00		0.74	1.00				1.00
Satd. Flow (perm)	520	3197	1430	372	3165		1239	1375				1396
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	645	605	216	735	4	547	3	197	0	2	18
RTOR Reduction (vph)	0	0	399	0	1	0	0	104	0	0	9	0
Lane Group Flow (vph)	12	645	206	216	738	0	547	96	0	0	11	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	35.7	34.5	34.5	47.5	43.3		50.5	50.5			50.5	
Effective Green, g (s)	33.7	38.4	38.4	46.5	47.2		53.5	53.5			53.5	
Actuated g/C Ratio	0.30	0.34	0.34	0.41	0.42		0.47	0.47			0.47	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	157	1087	486	252	1323		587	651			661	
v/s Ratio Prot	0.00	0.20		c0.07	0.23			0.07			0.01	
v/s Ratio Perm	0.02		0.14	c0.28			c0.44					
v/c Ratio	0.08	0.59	0.42	0.86	0.56		0.93	0.15			0.02	
Uniform Delay, d1	30.8	30.8	28.7	26.4	24.9		28.0	16.8			15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	2.4	2.7	24.5	1.7		23.7	0.5			0.0	
Delay (s)	31.1	33.2	31.4	50.9	26.6		51.6	17.3			15.8	
Level of Service	C	C	C	D	C		D	B			B	
Approach Delay (s)		32.3			32.1			42.4			15.8	
Approach LOS		C			C			D			B	
Intersection Summary												
HCM 2000 Control Delay		34.7			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		112.9			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		89.4%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

PM - Background (2026)
Nyom Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰
Traffic Volume (vph)	1	0	0	408	520	2
Future Volume (vph)	1	0	0	408	520	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.850	
Flt Protected	0.950					
Satd. Flow (prot)	1662	0	0	1683	1716	1488
Flt Permitted	0.950					
Satd. Flow (perm)	1662	0	0	1683	1716	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	2%	0%
Adj. Flow (vph)	1	0	0	443	565	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	443	565	2
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 39.7%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

PM - Background (2026)
Nyom Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↰
Traffic Volume (veh/h)	1	0	0	408	520	2
Future Volume (Veh/h)	1	0	0	408	520	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	443	565	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1008	565	567			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1008	565	567			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	269	528	1015			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	443	565	2		
Volume Left	1	0	0	0		
Volume Right	0	0	0	2		
cSH	269	1015	1700	1700		
Volume to Capacity	0.00	0.00	0.33	0.00		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	18.4	0.0	0.0	0.0		
Lane LOS	C					
Approach Delay (s)	18.4	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			39.7%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	7	0	6	7	3	5	5	421	6	4	435	7
Future Volume (vph)	7	0	6	7	3	5	5	421	6	4	435	7
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.937			0.958				0.850			0.850
Flt Protected		0.974			0.976			0.999				
Satd. Flow (prot)	0	1597	0	0	1636	0	0	1682	1488	0	1697	1488
Flt Permitted		0.974			0.976			0.999				
Satd. Flow (perm)	0	1597	0	0	1636	0	0	1682	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			922.6	
Travel Time (s)		83.0			10.0			123.3			66.4	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	8	0	7	8	3	5	5	458	7	4	473	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	16	0	0	463	7	0	477	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 41.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	7	0	6	7	3	5	5	421	6	4	435	7
Future Volume (Veh/h)	7	0	6	7	3	5	5	421	6	4	435	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	0	7	8	3	5	5	458	7	4	473	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	956	956	473	956	957	458	481			465		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	956	956	473	956	957	458	481			465		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	97	100	99	97	99	99	100			100		
cM capacity (veh/h)	234	258	595	235	257	607	1092			1022		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	16	463	7	477	8
Volume Left	8	8	5	0	4	0
Volume Right	7	5	0	7	0	8
cSH	327	297	1092	1700	1022	1700
Volume to Capacity	0.05	0.05	0.00	0.00	0.00	0.00
Queue Length 95th (m)	1.2	1.4	0.1	0.0	0.1	0.0
Control Delay (s)	16.5	17.8	0.1	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	16.5	17.8	0.1		0.1	
Approach LOS	C	C				

Intersection Summary

Average Delay 0.7

Intersection Capacity Utilization 41.8%

ICU Level of Service

A

Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	3	1	1	2	0	3	3	436	8	5	443	2
Future Volume (vph)	3	1	1	2	0	3	3	436	8	5	443	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Util. (m)	7.5			7.5			7.5			7.5		
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		0.973			0.919				0.850			0.850
Flt Protected		0.971			0.980						0.999	
Satd. Flow (prot)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Flt Permitted		0.971			0.980						0.999	
Satd. Flow (perm)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	3	1	1	2	0	3	3	474	9	5	482	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	5	0	0	477	9	0	487	2
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	42.3%
Analysis Period (min)	15
ICU Level of Service A	

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1	1	2	0	3	3	436	8	5	443	2
Future Volume (Veh/h)	3	1	1	2	0	3	3	436	8	5	443	2
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
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
Hourly flow rate (vph)	3	1	1	2	0	3	3	474	9	5	482	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	975	981	482	974	974	474	484					483
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	975	981	482	974	974	474	484					483
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1					4.1
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2					2.2
p0 queue free %	99	100	100	99	100	99	100					100
cM capacity (veh/h)	230	250	588	201	252	595	1089					1090

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	477	9	487	2
Volume Left	3	2	3	0	5	0
Volume Right	1	3	0	9	0	2
cSH	267	334	1089	1700	1090	1700
Volume to Capacity	0.02	0.01	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.5	0.4	0.1	0.0	0.1	0.0
Control Delay (s)	18.7	16.0	0.1	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	18.7	16.0	0.1	0.1		
Approach LOS	C	C				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2026)
Nycon Marine Fueling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	22	6	4	52	10	16	0	408	44	20	400	24	
Future Volume (vph)	22	6	4	52	10	16	0	408	44	20	400	24	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			7.5			7.5			
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	
Ped Bike Factor		1.00			1.00								
Frt		0.985			0.973				0.850			0.850	
Flt Protected		0.967			0.968				0.950				
Satd. Flow (prot)	0	1503	0	0	1609	0	1716	1681	1400	1395	1709	1458	
Flt Permitted		0.824			0.777				0.486				
Satd. Flow (perm)	0	1279	0	0	1291	0	1716	1681	1400	714	1709	1458	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		4			16				48			39	
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		388.1			2359.9			455.1			2151.0		
Travel Time (s)		27.9			169.9			32.8			154.9		
Confl. Peds. (#/hr)	1					1							
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	
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0	
Adj. Flow (vph)	24	7	4	57	11	17	0	443	48	22	435	26	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	35	0	0	85	0	0	443	48	22	435	26	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		

PTSL (200364)

Synchro 11 Report
Page 11

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2026)
Nycon Marine Fueling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm	
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			2	6		6
Detector Phase	4	4		8	8		2	2		2	6	6	6
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0		22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0		52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0		-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0	4.0
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max		Max	Max	Max	Max
Walk Time (s)				11.0	11.0								
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.7			12.7			51.9		51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.76		0.76	0.76	0.76	0.76
v/c Ratio		0.15			0.34			0.35		0.04	0.04	0.34	0.02
Control Delay		23.0			24.7			4.9		1.4	3.8	4.8	1.0
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0	0.0
Total Delay		23.0			24.7			4.9		1.4	3.8	4.8	1.0
LOS		C			C			A		A	A	A	A
Approach Delay		23.0			24.7			4.6				4.6	
Approach LOS		C			C			A				A	
Queue Length 50th (m)		3.5			8.1			18.8		0.0	0.7	18.2	0.0
Queue Length 95th (m)		10.8			20.1			37.1		2.7	2.9	35.8	1.5
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)								190.0		55.0			15.0
Base Capacity (vph)		507			519			1274		1073	541	1295	1114
Starvation Cap Reductn		0			0			0		0	0	0	0
Spillback Cap Reductn		0			0			0		0	0	0	0
Storage Cap Reductn		0			0			0		0	0	0	0
Reduced v/c Ratio		0.07			0.16			0.35		0.04	0.04	0.34	0.02
Intersection Summary													
Area Type:		Other											
Cycle Length:		83											
Actuated Cycle Length:		68.5											
Natural Cycle:		50											
Control Type:		Actuated-Uncoordinated											
Maximum v/c Ratio:		0.35											
Intersection Signal Delay:		6.7						Intersection LOS: A					
Intersection Capacity Utilization		43.3%						ICU Level of Service A					

PTSL (200364)

Synchro 11 Report
Page 12

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

PM - Background (2026)
Nyon Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	6	4	52	10	16	0	408	44	20	400	24
Future Volume (vph)	22	6	4	52	10	16	0	408	44	20	400	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1501			1608			1681	1400	1395	1709	1458
Flt Permitted		0.82			0.78			1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)		1279			1292			1681	1400	713	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	7	4	57	11	17	0	443	48	22	435	26
RTOR Reduction (vph)	0	3	0	0	14	0	0	0	13	0	0	7
Lane Group Flow (vph)	0	32	0	0	71	0	0	443	35	22	435	19
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.6			8.6			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.6			10.6			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		194			196			1232	1026	522	1252	1068
v/s Ratio Prot								c0.26			0.25	
v/s Ratio Perm		0.02			c0.06				0.03	0.03		0.01
v/c Ratio		0.16			0.36			0.36	0.03	0.04	0.35	0.02
Uniform Delay, d1		25.7			26.5			3.4	2.5	2.6	3.3	2.5
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4			1.2			0.8	0.1	0.2	0.8	0.0
Delay (s)		26.1			27.7			4.2	2.6	2.7	4.1	2.5
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.1			27.7			4.0			3.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.5			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.36										
Actuated Cycle Length (s)		69.7			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		43.3%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:50:42 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - BG 2026						
Leg North	0.82	1.12	6.22	0.42	A	6.61	A
Leg West	0.20	~1	4.74	0.16	A		
Leg South	1.14	?	7.55	0.51	A		
Leg East	0.09	~1	5.69	0.07	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:50:42 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - BG 2026, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2026, AM	BG 2026	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				6.61	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	436.00	100.000
West	ONE HOUR	✓	136.00	100.000
South	ONE HOUR	✓	496.00	100.000
East	ONE HOUR	✓	51.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	103.000	291.000	42.000
	West	102.000	0.000	32.000	2.000
	South	447.000	28.000	0.000	21.000
	East	42.000	0.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.24	0.67	0.10
	West	0.75	0.00	0.24	0.01
	South	0.90	0.06	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.42	6.22	0.82	1.12	A	400.08	600.12	55.75	5.57	0.62	55.76	5.57
West	0.16	4.74	0.20	~1	A	124.80	187.19	13.80	4.42	0.15	13.80	4.42
South	0.51	7.55	1.14	?	A	455.14	682.71	73.01	6.42	0.81	73.02	6.42
East	0.07	5.69	0.09	~1	A	46.80	70.20	6.12	5.23	0.07	6.12	5.23

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	328.24	82.06	326.44	442.41	27.69	0.00	1137.80	1083.45	0.288	0.00	0.45	4.974	A
West	102.39	25.60	101.92	98.07	256.06	0.00	1005.63	631.12	0.102	0.00	0.12	4.123	A
South	373.41	93.35	371.19	248.59	109.39	0.00	1090.52	814.10	0.342	0.00	0.56	5.388	A
East	38.40	9.60	38.19	48.66	431.91	0.00	903.86	428.66	0.042	0.00	0.05	4.795	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	391.96	97.99	391.41	530.45	33.21	0.00	1134.61	1083.45	0.345	0.45	0.59	5.439	A
West	122.26	30.57	122.14	117.59	307.03	0.00	976.13	631.12	0.125	0.12	0.15	4.364	A

South	445.89	111.47	445.11	298.06	131.10	0.00	1077.95	814.10	0.414	0.56	0.75	6.134	A
East	45.85	11.46	45.79	58.35	517.87	0.00	854.11	428.66	0.054	0.05	0.07	5.137	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	480.04	120.01	479.12	649.14	40.64	0.00	1130.31	1083.45	0.425	0.59	0.82	6.202	A
West	149.74	37.43	149.54	143.93	375.82	0.00	936.32	631.12	0.160	0.15	0.20	4.736	A
South	546.11	136.53	544.61	364.86	160.51	0.00	1060.93	814.10	0.515	0.75	1.13	7.508	A
East	56.15	14.04	56.06	71.41	633.71	0.00	787.06	428.66	0.071	0.07	0.09	5.680	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	480.04	120.01	480.03	650.67	40.74	0.00	1130.25	1083.45	0.425	0.82	0.82	6.220	A
West	149.74	37.43	149.74	144.23	376.53	0.00	935.91	631.12	0.160	0.20	0.20	4.740	A
South	546.11	136.53	546.07	365.53	160.75	0.00	1060.80	814.10	0.515	1.13	1.14	7.551	A
East	56.15	14.04	56.15	71.56	635.25	0.00	786.17	428.66	0.071	0.09	0.09	5.687	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	391.96	97.99	392.86	532.83	33.36	0.00	1134.52	1083.45	0.345	0.82	0.60	5.462	A
West	122.26	30.57	122.45	118.06	308.16	0.00	975.48	631.12	0.125	0.20	0.15	4.371	A
South	445.89	111.47	447.35	299.13	131.48	0.00	1077.73	814.10	0.414	1.14	0.77	6.179	A
East	45.85	11.46	45.94	58.59	520.25	0.00	852.73	428.66	0.054	0.09	0.07	5.147	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	328.24	82.06	328.80	445.81	27.91	0.00	1137.67	1083.45	0.289	0.60	0.46	5.005	A
West	102.39	25.60	102.51	98.80	257.91	0.00	1004.56	631.12	0.102	0.15	0.12	4.132	A
South	373.41	93.35	374.23	250.36	110.07	0.00	1090.13	814.10	0.343	0.77	0.57	5.435	A
East	38.40	9.60	38.45	49.03	435.27	0.00	901.91	428.66	0.043	0.07	0.05	4.810	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	6.58	0.44	4.974	A	A
West	1.71	0.11	4.123	A	A
South	8.08	0.54	5.388	A	A
East	0.75	0.05	4.795	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.63	0.58	5.439	A	A
West	2.18	0.15	4.364	A	A
South	11.00	0.73	6.134	A	A
East	0.96	0.06	5.137	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.96	0.80	6.202	A	A
West	2.89	0.19	4.736	A	A
South	16.29	1.09	7.508	A	A

East	1.30	0.09	5.680	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.34	0.82	6.220	A	A
West	2.94	0.20	4.740	A	A
South	16.98	1.13	7.551	A	A
East	1.32	0.09	5.687	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.20	0.61	5.462	A	A
West	2.28	0.15	4.371	A	A
South	11.93	0.80	6.179	A	A
East	1.01	0.07	5.147	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.03	0.47	5.005	A	A
West	1.80	0.12	4.132	A	A
South	8.72	0.58	5.435	A	A
East	0.79	0.05	4.810	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.45	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

South	1.13	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.82	0.00	0.00	0.00	1.12			N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.14	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.77	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.46	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:54:41 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - BG 2026						
Leg North	1.49	1.03	8.10	0.59	A	6.95	A
Leg West	0.20	~1	5.36	0.16	A		
Leg South	0.74	1.05	5.93	0.41	A		
Leg East	0.08	~1	5.25	0.07	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:54:41 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - BG 2026, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2026, PM	BG 2026	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				6.95	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	606.00	100.000
West	ONE HOUR	✓	122.00	100.000
South	ONE HOUR	✓	408.00	100.000
East	ONE HOUR	✓	53.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	110.000	466.000	30.000
	West	71.000	0.000	48.000	3.000
	South	335.000	38.000	0.000	35.000
	East	45.000	0.000	8.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.18	0.77	0.05
	West	0.58	0.00	0.39	0.02
	South	0.82	0.09	0.00	0.09
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.59	8.10	1.49	1.03	A	556.08	834.11	92.94	6.69	1.03	92.95	6.69
West	0.16	5.36	0.20	~1	A	111.95	167.92	13.67	4.88	0.15	13.67	4.88
South	0.41	5.93	0.74	1.05	A	374.39	561.58	49.60	5.30	0.55	49.61	5.30
East	0.07	5.25	0.08	~1	A	48.63	72.95	5.99	4.93	0.07	5.99	4.93

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	456.23	114.06	453.48	337.79	34.45	0.00	1133.89	1063.96	0.402	0.00	0.69	5.427	A
West	91.85	22.96	91.40	110.77	377.16	0.00	935.54	608.99	0.098	0.00	0.11	4.431	A
South	307.16	76.79	305.56	390.67	77.89	0.00	1108.75	909.56	0.277	0.00	0.40	4.706	A
East	39.90	9.98	39.70	50.91	332.54	0.00	961.37	467.45	0.042	0.00	0.05	4.630	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	544.78	136.20	543.74	404.92	41.30	0.00	1129.93	1063.96	0.482	0.69	0.95	6.313	A
West	109.68	27.42	109.55	132.81	452.23	0.00	892.10	608.99	0.123	0.11	0.14	4.782	A

South	366.78	91.70	366.30	468.41	93.36	0.00	1099.79	909.56	0.334	0.40	0.52	5.161	A
East	47.65	11.91	47.59	61.03	398.63	0.00	923.12	467.45	0.052	0.05	0.06	4.875	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	667.22	166.80	665.12	495.68	50.56	0.00	1124.57	1063.96	0.593	0.95	1.47	8.032	A
West	134.32	33.58	134.11	162.49	553.18	0.00	833.67	608.99	0.161	0.14	0.20	5.348	A
South	449.22	112.30	448.38	573.02	114.27	0.00	1087.69	909.56	0.413	0.52	0.73	5.918	A
East	58.35	14.59	58.27	74.69	487.96	0.00	871.42	467.45	0.067	0.06	0.08	5.250	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	667.22	166.80	667.16	496.54	50.65	0.00	1124.52	1063.96	0.593	1.47	1.49	8.104	A
West	134.32	33.58	134.32	162.94	554.86	0.00	832.70	608.99	0.161	0.20	0.20	5.358	A
South	449.22	112.30	449.20	574.68	114.50	0.00	1087.56	909.56	0.413	0.73	0.74	5.933	A
East	58.35	14.59	58.35	74.86	488.84	0.00	870.91	467.45	0.067	0.08	0.08	5.253	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	544.78	136.20	546.84	406.30	41.44	0.00	1129.84	1063.96	0.482	1.49	0.97	6.383	A
West	109.68	27.42	109.88	133.50	454.78	0.00	890.62	608.99	0.123	0.20	0.15	4.796	A
South	366.78	91.70	367.60	470.95	93.72	0.00	1099.59	909.56	0.334	0.74	0.53	5.180	A
East	47.65	11.91	47.73	61.31	400.02	0.00	922.31	467.45	0.052	0.08	0.06	4.883	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	456.23	114.06	457.31	340.07	34.69	0.00	1133.75	1063.96	0.402	0.97	0.70	5.489	A
West	91.85	22.96	91.98	111.67	380.33	0.00	933.71	608.99	0.098	0.15	0.11	4.448	A
South	307.16	76.79	307.66	393.88	78.43	0.00	1108.44	909.56	0.277	0.53	0.41	4.733	A
East	39.90	9.98	39.95	51.29	334.80	0.00	960.06	467.45	0.042	0.06	0.05	4.639	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.93	0.66	5.427	A	A
West	1.65	0.11	4.431	A	A
South	5.84	0.39	4.706	A	A
East	0.75	0.05	4.630	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.78	0.92	6.313	A	A
West	2.14	0.14	4.782	A	A
South	7.67	0.51	5.161	A	A
East	0.95	0.06	4.875	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.12	1.41	8.032	A	A
West	2.92	0.19	5.348	A	A
South	10.69	0.71	5.918	A	A

East	1.25	0.08	5.250	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	22.21	1.48	8.104	A	A
West	2.98	0.20	5.358	A	A
South	11.02	0.73	5.933	A	A
East	1.27	0.08	5.253	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.10	1.01	6.383	A	A
West	2.24	0.15	4.796	A	A
South	8.16	0.54	5.180	A	A
East	0.99	0.07	4.883	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.79	0.72	5.489	A	A
West	1.74	0.12	4.448	A	A
South	6.22	0.41	4.733	A	A
East	0.79	0.05	4.639	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.40	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.95	0.00	0.00	1.03	1.03			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.47	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
						Percentiles could not be calculated. This may			

South	0.73	~1	~1	~1	~1	be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.49	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.74	0.00	0.00	0.00	1.05			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.97	0.00	0.00	1.03	1.03			N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.70	0.00	0.00	0.00	1.03			N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.41	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2031)

Nyon Marine Fuelling Corp Phase 1 TIS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖	
Traffic Volume (vph)	5	574	494	157	513	2	590	3	205	2	5	11	
Future Volume (vph)	5	574	494	157	513	2	590	3	205	2	5	11	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (m)	100.0			100.0			100.0			100.0			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor							1.00				0.99		
Frt			0.850		0.999			0.852			0.894		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1402	0	
Flt Permitted	0.426			0.145			0.746			0.585			
Satd. Flow (perm)	746	3167	1340	223	3105	0	1230	1395	0	1024	1402	0	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)			537					223			12		
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		1123.3			1937.5			219.0			350.8		
Travel Time (s)		80.9			139.5			15.8			25.3		
Confl. Peds. (#/hr)							1					1	
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%	
Adj. Flow (vph)	5	624	537	171	558	2	641	3	223	2	5	12	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	5	624	537	171	560	0	641	226	0	2	17	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		3.6			3.6			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2	1	1	2		1	2		1	2		
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru		
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0		
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		

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Synchro 11 Report
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2031)

Nyon Marine Fuelling Corp Phase 1 TIS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm	
Protected Phases	7	4		3	8			2			6		
Permitted Phases	4		4	8			2				6		
Detector Phase	7	4	4	3	8		2	2			6	6	
Switch Phase													
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0			15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0			43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9			68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%			61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9			61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0			5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0			2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0			-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max			C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0			13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0			23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0			0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9			64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57			0.57	0.57	
v/c Ratio	0.02	0.86	0.74	0.91	0.53		0.91	0.25			0.00	0.02	
Control Delay	24.2	54.5	10.5	76.2	33.1		40.3	2.3			10.5	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0	
Total Delay	24.2	54.5	10.5	76.2	33.1		40.3	2.3			10.5	6.1	
LOS	C	D	B	E	C		D	A			B	A	
Approach Delay		34.1			43.2			30.4				6.5	
Approach LOS		C			D			C				A	
Queue Length 50th (m)	0.8	73.5	0.0	28.8	53.4		125.0	0.3			0.2	0.5	
Queue Length 95th (m)	3.5	#103.3	36.6	#67.5	80.5		#210.4	10.7			1.3	3.7	
Internal Link Dist (m)		1099.3			1913.5			195.0				326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0				90.0		
Base Capacity (vph)	245	729	721	188	1050		707	896			588	811	
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	0.02	0.86	0.74	0.91	0.53		0.91	0.25			0.00	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 35.1

Intersection LOS: D

PTSL 200364

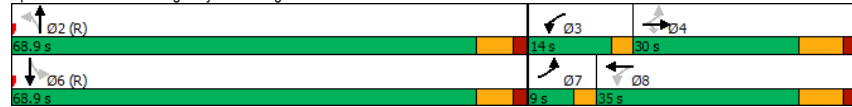
Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

Intersection Capacity Utilization 82.7%
ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	5	574	494	157	513	2	590	3	205	2	5	11
Future Volume (vph)	5	574	494	157	513	2	590	3	205	2	5	11
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3107		1567	1395		1662	1402	
Flt Permitted	0.43	1.00	1.00	0.15	1.00		0.75	1.00		0.59	1.00	
Satd. Flow (perm)	746	3167	1340	223	3107		1231	1395		1024	1402	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	624	537	171	558	2	641	3	223	2	5	12
RTOR Reduction (vph)	0	0	402	0	0	0	0	100	0	0	5	0
Lane Group Flow (vph)	5	624	135	171	560	0	641	126	0	2	12	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	158	796	337	183	1051		681	772		566	776	
v/s Ratio Prot	0.00	0.20		c0.08	0.18			0.09			0.01	
v/s Ratio Perm	0.01		0.10	c0.23			c0.52			0.00		
v/c Ratio	0.03	0.78	0.40	0.93	0.53		0.94	0.16		0.00	0.02	
Uniform Delay, d1	35.5	39.4	35.2	30.6	30.1		23.5	12.4		11.3	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	7.6	3.5	48.1	1.9		22.8	0.5		0.0	0.0	
Delay (s)	35.6	47.0	38.7	78.7	32.1		46.2	12.8		11.3	11.4	
Level of Service	D	D	D	E	C		D	B		B	B	
Approach Delay (s)		43.1			43.0			37.5			11.4	
Approach LOS		D			D			D			B	
Intersection Summary												
HCM 2000 Control Delay		41.1										
HCM 2000 Volume to Capacity ratio		0.92										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		82.7%								E		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	1	0	548	365	2
Future Volume (vph)	0	1	0	548	365	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.850
Fit Protected						
Satd. Flow (prot)	1514	0	0	1620	1562	1488
Fit Permitted						
Satd. Flow (perm)	1514	0	0	1620	1562	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	8%	12%	0%
Adj. Flow (vph)	0	1	0	596	397	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	596	397	2
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	41.3%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	1	0	548	365	2
Future Volume (Veh/h)	0	1	0	548	365	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	596	397	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	993	397	399			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	993	397	399			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	274	657	1171			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	596	397	2		
Volume Left	0	0	0	0		
Volume Right	1	0	0	2		
cSH	657	1171	1700	1700		
Volume to Capacity	0.00	0.00	0.23	0.00		
Queue Length 95th (m)	0.0	0.0	0.0	0.0		
Control Delay (s)	10.5	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	10.5	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			41.3%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	6	1	1	2	0	8	3	542	3	1	350	3
Future Volume (vph)	6	1	1	2	0	8	3	542	3	1	350	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.985			0.890				0.850			0.850
Flt Protected		0.963			0.991							
Satd. Flow (prot)	0	1321	0	0	1543	0	0	1606	1488	0	1563	1488
Flt Permitted		0.963			0.991							
Satd. Flow (perm)	0	1321	0	0	1543	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			922.6
Travel Time (s)		83.0			10.0				123.3			66.4
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	7	1	1	2	0	9	3	589	3	1	380	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	11	0	0	592	3	0	381	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 47.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	6	1	1	2	0	8	3	542	3	1	350	3
Future Volume (Veh/h)	6	1	1	2	0	8	3	542	3	1	350	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	1	1	2	0	9	3	589	3	1	380	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	986	980	380	978	980	589	383			592		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	986	980	380	978	980	589	383			592		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	99	100	98	100			100		
cM capacity (veh/h)	195	251	671	230	251	512	1187			994		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	11	592	3	381	3
Volume Left	7	2	3	0	1	0
Volume Right	1	9	0	3	0	3
cSH	218	419	1187	1700	994	1700
Volume to Capacity	0.04	0.03	0.00	0.00	0.00	0.00
Queue Length 95th (m)	1.0	0.6	0.1	0.0	0.0	0.0
Control Delay (s)	22.2	13.8	0.1	0.0	0.0	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	22.2	13.8	0.1	0.0		
Approach LOS	C	B				

Intersection Summary

Average Delay 0.4
Intersection Capacity Utilization 47.8% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	5	9	0	2	2	536	2	1	354	0
Future Volume (vph)	1	0	5	9	0	2	2	536	2	1	354	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.887			0.977				0.850			
Flt Protected		0.992			0.960							
Satd. Flow (prot)	0	1540	0	0	1596	0	0	1606	1118	0	1559	1750
Flt Permitted		0.992			0.960							
Satd. Flow (perm)	0	1540	0	0	1596	0	0	1606	1118	0	1559	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	5	10	0	2	2	583	2	1	385	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	12	0	0	585	2	0	386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 42.4%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	5	9	0	2	2	536	2	1	354	0
Future Volume (Veh/h)	1	0	5	9	0	2	2	536	2	1	354	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	5	10	0	2	2	583	2	1	385	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	976	976	385	979	974	583	385			585		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	976	976	385	979	974	583	385			585		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	100	100	99	96	100	100	100			100		
cM capacity (veh/h)	231	252	667	229	253	485	1185			645		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	12	585	2	386	0
Volume Left	1	10	2	0	1	0
Volume Right	5	2	0	2	0	0
cSH	507	251	1185	1700	645	1700
Volume to Capacity	0.01	0.05	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.3	1.2	0.0	0.0	0.0	0.0
Control Delay (s)	12.2	20.1	0.0	0.0	0.0	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	12.2	20.1	0.0		0.0	
Approach LOS	B	C				

Intersection Summary

Average Delay 0.4
Intersection Capacity Utilization 42.4% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	17	7	0	30	10	22	3	499	28	31	318	22	
Future Volume (vph)	17	7	0	30	10	22	3	499	28	31	318	22	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			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					0.952				0.850			0.850	
Flt Protected	0.967				0.976		0.950			0.950			
Satd. Flow (prot)	0	1296	0	0	1272	0	1662	1636	1305	1087	1606	1118	
Flt Permitted	0.828				0.833		0.553			0.436			
Satd. Flow (perm)	0	1110	0	0	1086	0	968	1636	1305	499	1606	1118	
Right Turn on Red	Yes			Yes			Yes			Yes			
Satd. Flow (RTOR)				24			39			39			
Link Speed (k/h)	50				50			50			50		
Link Distance (m)	388.1				2359.9			455.1			2151.0		
Travel Time (s)	27.9				169.9			32.8			154.9		
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Adj. Flow (vph)	18	8	0	33	11	24	3	542	30	34	346	24	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	26	0	0	68	0	3	542	30	34	346	24	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	0.0				0.0			3.6			3.6		
Link Offset(m)	0.0				0.0			0.0			0.0		
Crosswalk Width(m)	4.8				4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)	11.0	11.0											
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.5			12.5		54.5	54.5	54.5	54.5	54.5	54.5	
Actuated g/C Ratio		0.19			0.19		0.82	0.82	0.82	0.82	0.82	0.82	
v/c Ratio		0.12			0.30		0.00	0.40	0.03	0.08	0.26	0.03	
Control Delay		24.9			21.3		3.3	4.7	1.1	4.0	3.8	0.9	
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		24.9			21.3		3.3	4.7	1.1	4.0	3.8	0.9	
LOS		C			C		A	A	A	A	A	A	
Approach Delay		24.9			21.3			4.6			3.6		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		3.0			5.1		0.1	25.4	0.0	1.1	13.7	0.0	
Queue Length 95th (m)		9.2			15.7		0.8	48.4	1.7	4.1	27.0	1.3	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)		452			456		792	1339	1075	408	1315	922	
Starvation Cap Reductn		0			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.06			0.15		0.00	0.40	0.03	0.08	0.26	0.03	
Intersection Summary													
Area Type:		Other											
Cycle Length:		83											
Actuated Cycle Length:		66.5											
Natural Cycle:		55											
Control Type:		Actuated-Uncoordinated											
Maximum v/c Ratio:		0.40											
Intersection Signal Delay:		5.8							Intersection LOS: A				
Intersection Capacity Utilization		43.5%							ICU Level of Service A				
Analysis Period (min)		15											

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 6: Highway 140 & Concession 2 Road

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

AM - Background (2031)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations		↔			↕		↖	↗	↖	↖	↗	↗
Traffic Volume (vph)	17	7	0	30	10	22	3	499	28	31	318	22
Future Volume (vph)	17	7	0	30	10	22	3	499	28	31	318	22
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1296			1273		1662	1636	1305	1087	1606	1118
Flt Permitted		0.83			0.83		0.55	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)		1111			1086		968	1636	1305	498	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	18	8	0	33	11	24	3	542	30	34	346	24
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	7	0	0	6
Lane Group Flow (vph)	0	26	0	0	47	0	3	542	23	34	346	18
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.2			6.2		49.7	49.7	49.7	49.7	49.7	49.7
Effective Green, g (s)		8.2			8.2		52.7	52.7	52.7	52.7	52.7	52.7
Actuated g/C Ratio		0.12			0.12		0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		132			129		740	1251	998	380	1228	855
v/s Ratio Prot								c0.33			0.22	
v/s Ratio Perm		0.02			c0.04		0.00		0.02	0.07		0.02
v/c Ratio		0.20			0.36		0.00	0.43	0.02	0.09	0.28	0.02
Uniform Delay, d1		27.4			27.9		1.9	2.8	1.9	2.0	2.4	1.9
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.7			1.7		0.0	1.1	0.0	0.5	0.6	0.0
Delay (s)		28.1			29.7		1.9	3.9	2.0	2.5	3.0	2.0
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		28.1			29.7			3.8			2.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.7		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			68.9		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			43.5%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

1: Highway 140 & Regional Road 27

Nyon Marine Fueling Corp Phase 1 TIS

PTSL (200364)

1: Highway 140 & Regional Road 27

Nyon Marine Fueling Corp Phase 1 TIS

PTSL (200364)

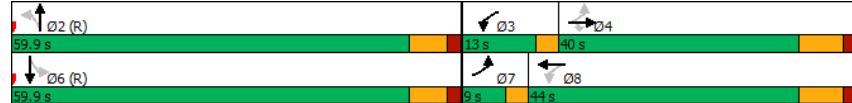
Area Type:	Other
Cycle Length:	112.9
Actuated Cycle Length:	112.9
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.01
Intersection Signal Delay:	35.7
Intersection LOS:	D

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

Intersection Capacity Utilization 94.5%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

	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 (vph)	13	654	615	219	746	5	556	3	200	0	2	18
Future Volume (vph)	13	654	615	219	746	5	556	3	200	0	2	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1374				
Flt Permitted	0.24	1.00	1.00	0.18	1.00		0.74	1.00				
Satd. Flow (perm)	407	3197	1430	302	3165		1237	1374				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	711	668	238	811	5	604	3	217	0	2	20
RTOR Reduction (vph)	0	0	444	0	1	0	0	113	0	0	10	0
Lane Group Flow (vph)	14	711	224	238	815	0	604	107	0	0	12	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1	
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1	
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	138	1070	478	227	1272		592	658			667	
v/s Ratio Prot	0.00	0.22		c0.08	0.26			0.08			0.01	
v/s Ratio Perm	0.03		0.16	c0.34			c0.49					
v/c Ratio	0.10	0.66	0.47	1.05	0.64		1.02	0.16			0.02	
Uniform Delay, d1	28.0	32.1	29.6	29.2	27.2		29.4	16.6			15.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	3.3	3.3	73.0	2.5		42.2	0.5			0.0	
Delay (s)	28.5	35.4	32.9	102.3	29.7		71.6	17.1			15.5	
Level of Service	C	D	C	F	C		E	B			B	
Approach Delay (s)		34.1			46.1			57.1			15.5	
Approach LOS		C			D			E			B	
Intersection Summary												
HCM 2000 Control Delay		43.6										
HCM 2000 Volume to Capacity ratio		1.01										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		94.5%								F		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	450	574	2
Future Volume (vph)	1	0	0	450	574	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.850	
Flt Protected	0.950					
Satd. Flow (prot)	1662	0	0	1683	1716	1488
Flt Permitted	0.950					
Satd. Flow (perm)	1662	0	0	1683	1716	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	2%	0%
Adj. Flow (vph)	1	0	0	489	624	2
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	489	624	2
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 42.8%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	450	574	2
Future Volume (Veh/h)	1	0	0	450	574	2
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	489	624	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1113	624	626			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1113	624	626			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	233	489	965			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	489	624	2		
Volume Left	1	0	0	0		
Volume Right	0	0	0	2		
cSH	233	965	1700	1700		
Volume to Capacity	0.00	0.00	0.37	0.00		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	20.5	0.0	0.0	0.0		
Lane LOS	C					
Approach Delay (s)	20.5	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			42.8%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

PM - Background (2031)
Nyön Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	8	0	7	8	3	6	6	465	7	5	480	8	
Future Volume (vph)	8	0	7	8	3	6	6	465	7	5	480	8	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (m)	7.5			7.5			7.5			7.5			
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		0.936			0.950				0.850			0.850	
Flt Protected		0.974			0.977			0.999					
Satd. Flow (prot)	0	1595	0	0	1624	0	0	1682	1488	0	1697	1488	
Flt Permitted		0.974			0.977			0.999					
Satd. Flow (perm)	0	1595	0	0	1624	0	0	1682	1488	0	1697	1488	
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		1152.3			139.3			1712.9			922.6		
Travel Time (s)		83.0			10.0			123.3			66.4		
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%	
Adj. Flow (vph)	9	0	8	9	3	7	7	505	8	5	522	9	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	17	0	0	19	0	0	512	8	0	527	9	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			0.0			0.0		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Sign Control		Stop			Stop			Free			Free		
Intersection Summary													
Area Type:	Other												
Control Type:	Unsignalized												
Intersection Capacity Utilization 44.4%	ICU Level of Service A												
Analysis Period (min) 15													

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

PM - Background (2031)
Nyön Marine Fueling Corp Phase 1 TIS

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	8	0	7	8	3	6	6	465	7	5	480	8	
Future Volume (Veh/h)	8	0	7	8	3	6	6	465	7	5	480	8	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
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	
Hourly flow rate (vph)	9	0	8	9	3	7	7	505	8	5	522	9	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None								None				
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	1060	1059	522	1059	1060	505	531				513		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1060	1059	522	1059	1060	505	531				513		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1				4.3		
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				2.4		
p0 queue free %	95	100	99	95	99	99	99				99		
cM capacity (veh/h)	198	224	559	199	223	571	1047				980		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	17	19	512	8	527	9							
Volume Left	9	9	7	0	5	0							
Volume Right	8	7	0	8	0	9							
cSH	284	268	1047	1700	980	1700							
Volume to Capacity	0.06	0.07	0.01	0.00	0.01	0.01							
Queue Length 95th (m)	1.5	1.8	0.2	0.0	0.1	0.0							
Control Delay (s)	18.5	19.4	0.2	0.0	0.1	0.0							
Lane LOS	C	C	A	A									
Approach Delay (s)	18.5	19.4	0.2	0.1									
Approach LOS	C	C											
Intersection Summary													
Average Delay	0.8												
Intersection Capacity Utilization	44.4%			ICU Level of Service					A				
Analysis Period (min)	15												

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

PM - Background (2031)
Nyön Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	3	1	1	2	0	3	3	481	9	6	489	2
Future Volume (vph)	3	1	1	2	0	3	3	481	9	6	489	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Util. (m)	7.5			7.5			7.5			7.5		
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		0.973			0.919				0.850			0.850
Flt Protected		0.971			0.980						0.999	
Satd. Flow (prot)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Flt Permitted		0.971			0.980						0.999	
Satd. Flow (perm)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	3	1	1	2	0	3	3	523	10	7	532	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	5	0	0	526	10	0	539	2
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Area Type:	Other	
Control Type:	Unsignalized	
Intersection Capacity Utilization	45.0%	ICU Level of Service A
Analysis Period (min)	15	

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

PM - Background (2031)
Nyön Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	1	1	2	0	3	3	481	9	6	489	2
Future Volume (Veh/h)	3	1	1	2	0	3	3	481	9	6	489	2
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	3	1	1	2	0	3	3	523	10	7	532	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None								None			
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1078	1085	532	1076	1077	523	534	533				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1078	1085	532	1076	1077	523	534	533				
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2	2.2				
p0 queue free %	98	100	100	99	100	99	100	99				
cM capacity (veh/h)	196	216	551	170	219	558	1044	1045				

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	526	10	539	2
Volume Left	3	2	3	0	7	0
Volume Right	1	3	0	10	0	2
cSH	230	291	1044	1700	1045	1700
Volume to Capacity	0.02	0.02	0.00	0.01	0.01	0.00
Queue Length 95th (m)	0.5	0.4	0.1	0.0	0.2	0.0
Control Delay (s)	21.0	17.6	0.1	0.0	0.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	21.0	17.6	0.1	0.2		
Approach LOS	C	C				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	24	7	5	57	11	17	0	450	48	22	442	26
Future Volume (vph)	24	7	5	57	11	17	0	450	48	22	442	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt	0.983				0.974				0.850			0.850
Flt Protected	0.968				0.967				0.950			
Satd. Flow (prot)	0	1502	0	0	1609	0	1716	1681	1400	1395	1709	1458
Flt Permitted	0.820				0.774				0.456			
Satd. Flow (perm)	0	1271	0	0	1288	0	1716	1681	1400	670	1709	1458
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)	5				16				52			39
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	388.1				2359.9			455.1			2151.0	
Travel Time (s)	27.9				169.9			32.8			154.9	
Confl. Peds. (#/hr)	1				1							
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	26	8	5	62	12	18	0	489	52	24	480	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	92	0	0	489	52	24	480	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0			3.6			3.6	
Link Offset(m)	0.0				0.0			0.0			0.0	
Crosswalk Width(m)	4.8				4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			2	6	6
Detector Phase	4	4		8	8		2	2		2	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0		22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0		52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0		-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max		Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		12.8			12.8			51.9		51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.76		0.76	0.76	0.76
v/c Ratio		0.16			0.36			0.38		0.05	0.05	0.37
Control Delay		22.9			25.2			5.3		1.4	3.9	5.2
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		22.9			25.2			5.3		1.4	3.9	5.2
LOS		C			C			A		A	A	A
Approach Delay		22.9			25.2			4.9				4.9
Approach LOS		C			C			A				A
Queue Length 50th (m)		3.9			9.0			21.6		0.0	0.8	20.9
Queue Length 95th (m)		11.5			21.6			43.7		2.9	3.2	42.2
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)										190.0	55.0	15.0
Base Capacity (vph)		503			516			1271		1071	506	1292
Starvation Cap Reductn		0			0			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.08			0.18			0.38		0.05	0.05	0.37
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		68.7										
Natural Cycle:		50										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.38										
Intersection Signal Delay:		7.1						Intersection LOS: A				
Intersection Capacity Utilization		43.3%						ICU Level of Service A				

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

PM - Background (2031)
Nyon Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	7	5	57	11	17	0	450	48	22	442	26
Future Volume (vph)	24	7	5	57	11	17	0	450	48	22	442	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1499			1609			1681	1400	1395	1709	1458
Flt Permitted		0.82			0.77			1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)		1271			1287			1681	1400	670	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	8	5	62	12	18	0	489	52	24	480	28
RTOR Reduction (vph)	0	4	0	0	14	0	0	0	14	0	0	8
Lane Group Flow (vph)	0	35	0	0	78	0	0	489	38	24	480	20
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.8			8.8			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.8			10.8			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		196			198			1228	1023	489	1249	1065
v/s Ratio Prot								c0.29			0.28	
v/s Ratio Perm		0.03			c0.06				0.03	0.04		0.01
v/c Ratio		0.18			0.40			0.40	0.04	0.05	0.38	0.02
Uniform Delay, d1		25.7			26.6			3.6	2.6	2.6	3.5	2.6
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4			1.3			1.0	0.1	0.2	0.9	0.0
Delay (s)		26.1			27.9			4.5	2.7	2.8	4.4	2.6
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.1			27.9			4.4			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.8			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.40										
Actuated Cycle Length (s)		69.9			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		43.3%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:55:01 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - BG 2031						
Leg North	0.99	1.12	6.76	0.47	A	7.36	A
Leg West	0.23	~1	4.99	0.18	A		
Leg South	1.44	1.08	8.67	0.57	A		
Leg East	0.10	~1	6.06	0.08	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:55:00 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - BG 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2031, AM	BG 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				7.36	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	481.00	100.000
West	ONE HOUR	✓	151.00	100.000
South	ONE HOUR	✓	548.00	100.000
East	ONE HOUR	✓	56.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	114.000	321.000	46.000
	West	113.000	0.000	36.000	2.000
	South	494.000	31.000	0.000	23.000
	East	46.000	0.000	10.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.24	0.67	0.10
	West	0.75	0.00	0.24	0.01
	South	0.90	0.06	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.47	6.76	0.99	1.12	A	441.37	662.06	65.62	5.95	0.73	65.63	5.95
West	0.18	4.99	0.23	~1	A	138.56	207.84	15.97	4.61	0.18	15.97	4.61
South	0.57	8.67	1.44	1.08	A	502.85	754.28	89.48	7.12	0.99	89.49	7.12
East	0.08	6.06	0.10	~1	A	51.39	77.08	7.06	5.50	0.08	7.06	5.50

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	362.12	90.53	360.04	488.66	30.68	0.00	1136.07	1082.88	0.319	0.00	0.52	5.199	A
West	113.68	28.42	113.15	108.52	282.19	0.00	990.51	631.39	0.115	0.00	0.13	4.247	A
South	412.56	103.14	409.94	274.74	120.60	0.00	1084.03	815.59	0.381	0.00	0.66	5.744	A
East	42.16	10.54	41.93	53.14	477.40	0.00	877.53	428.15	0.048	0.00	0.06	4.968	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	432.41	108.10	431.75	585.96	36.79	0.00	1132.54	1082.88	0.382	0.52	0.69	5.767	A
West	135.75	33.94	135.60	130.14	338.40	0.00	957.98	631.39	0.142	0.13	0.17	4.535	A

South	492.64	123.16	491.63	329.44	144.56	0.00	1070.16	815.59	0.460	0.66	0.91	6.705	A
East	50.34	12.59	50.28	63.72	572.47	0.00	822.50	428.15	0.061	0.06	0.07	5.377	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	529.59	132.40	528.41	716.84	45.01	0.00	1127.78	1082.88	0.470	0.69	0.98	6.734	A
West	166.25	41.56	166.02	159.25	414.17	0.00	914.13	631.39	0.182	0.17	0.23	4.983	A
South	603.36	150.84	601.30	403.21	176.97	0.00	1051.40	815.59	0.574	0.91	1.42	8.595	A
East	61.66	15.41	61.54	77.97	700.30	0.00	748.52	428.15	0.082	0.07	0.10	6.045	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	529.59	132.40	529.56	718.91	45.14	0.00	1127.70	1082.88	0.470	0.98	0.99	6.761	A
West	166.25	41.56	166.25	159.64	415.06	0.00	913.61	631.39	0.182	0.23	0.23	4.989	A
South	603.36	150.84	603.30	404.06	177.26	0.00	1051.24	815.59	0.574	1.42	1.44	8.674	A
East	61.66	15.41	61.66	78.17	702.39	0.00	747.31	428.15	0.083	0.10	0.10	6.055	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	432.41	108.10	433.56	589.12	36.99	0.00	1132.42	1082.88	0.382	0.99	0.70	5.796	A
West	135.75	33.94	135.98	130.74	339.81	0.00	957.16	631.39	0.142	0.23	0.17	4.542	A
South	492.64	123.16	494.66	330.77	145.02	0.00	1069.90	815.59	0.460	1.44	0.93	6.779	A
East	50.34	12.59	50.45	64.03	575.65	0.00	820.66	428.15	0.061	0.10	0.08	5.391	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	362.12	90.53	362.81	492.73	30.94	0.00	1135.92	1082.88	0.319	0.70	0.53	5.237	A
West	113.68	28.42	113.83	109.39	284.36	0.00	989.25	631.39	0.115	0.17	0.14	4.261	A
South	412.56	103.14	413.62	276.80	121.39	0.00	1083.57	815.59	0.381	0.93	0.67	5.810	A
East	42.16	10.54	42.23	53.56	481.44	0.00	875.19	428.15	0.048	0.08	0.06	4.985	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.58	0.51	5.199	A	A
West	1.96	0.13	4.247	A	A
South	9.50	0.63	5.744	A	A
East	0.85	0.06	4.968	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.06	0.67	5.767	A	A
West	2.51	0.17	4.535	A	A
South	13.23	0.88	6.705	A	A
East	1.10	0.07	5.377	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.26	0.95	6.734	A	A
West	3.37	0.22	4.983	A	A
South	20.41	1.36	8.595	A	A

East	1.51	0.10	6.045	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.78	0.99	6.761	A	A
West	3.44	0.23	4.989	A	A
South	21.49	1.43	8.674	A	A
East	1.55	0.10	6.055	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.81	0.72	5.796	A	A
West	2.63	0.18	4.542	A	A
South	14.52	0.97	6.779	A	A
East	1.16	0.08	5.391	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.13	0.54	5.237	A	A
West	2.06	0.14	4.261	A	A
South	10.34	0.69	5.810	A	A
East	0.90	0.06	4.985	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.52	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.69	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.91	0.00	0.00	0.00	1.08			N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.98	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
						Percentiles could not be calculated. This may			

South	1.42	?	?	?	?	be because the mean queue is very small or very big.		N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.99	0.00	0.00	0.00	1.12			N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.44	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.93	0.00	0.00	0.00	1.08			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.67	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 1:02:12 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - BG 2031						
Leg North	1.95	2.06	9.67	0.66	A	8.01	A
Leg West	0.23	~1	5.74	0.18	A		
Leg South	0.92	1.05	6.58	0.47	A		
Leg East	0.10	~1	5.53	0.08	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 1:02:11 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - BG 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2031, PM	BG 2031	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				8.01	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	669.00	100.000
West	ONE HOUR	✓	134.00	100.000
South	ONE HOUR	✓	459.00	100.000
East	ONE HOUR	✓	58.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	122.000	514.000	33.000
	West	78.000	0.000	53.000	3.000
	South	375.000	45.000	0.000	39.000
	East	49.000	0.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.18	0.77	0.05
	West	0.58	0.00	0.40	0.02
	South	0.82	0.10	0.00	0.08
	East	0.84	0.00	0.16	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.66	9.67	1.95	2.06	A	613.89	920.83	116.77	7.61	1.30	116.79	7.61
West	0.18	5.74	0.23	~1	A	122.96	184.44	15.85	5.16	0.18	15.85	5.16
South	0.47	6.58	0.92	1.05	A	421.19	631.78	60.43	5.74	0.67	60.43	5.74
East	0.08	5.53	0.10	~1	A	53.22	79.83	6.83	5.14	0.08	6.83	5.14

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	503.66	125.91	500.39	375.89	40.43	0.00	1130.43	1060.31	0.446	0.00	0.82	5.854	A
West	100.88	25.22	100.37	124.94	415.88	0.00	913.14	610.19	0.110	0.00	0.13	4.601	A
South	345.56	86.39	343.66	430.89	85.35	0.00	1104.43	910.08	0.313	0.00	0.48	4.966	A
East	43.67	10.92	43.44	56.13	372.88	0.00	938.02	466.29	0.047	0.00	0.06	4.771	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	601.42	150.35	600.04	450.64	48.47	0.00	1125.77	1060.31	0.534	0.82	1.16	7.034	A
West	120.46	30.12	120.31	149.82	498.70	0.00	865.20	610.19	0.139	0.13	0.17	5.022	A

South	412.63	103.16	412.01	516.68	102.32	0.00	1094.61	910.08	0.377	0.48	0.63	5.543	A
East	52.14	13.04	52.08	67.30	447.03	0.00	895.10	466.29	0.058	0.06	0.07	5.064	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	736.58	184.15	733.54	551.56	59.33	0.00	1119.49	1060.31	0.658	1.16	1.92	9.529	A
West	147.54	36.88	147.27	183.21	609.66	0.00	800.98	610.19	0.184	0.17	0.23	5.722	A
South	505.37	126.34	504.25	631.73	125.21	0.00	1081.36	910.08	0.467	0.63	0.91	6.547	A
East	63.86	15.96	63.76	82.33	547.13	0.00	837.17	466.29	0.076	0.07	0.10	5.520	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	736.58	184.15	736.47	552.69	59.45	0.00	1119.42	1060.31	0.658	1.92	1.95	9.674	A
West	147.54	36.88	147.53	183.85	612.08	0.00	799.58	610.19	0.185	0.23	0.23	5.739	A
South	505.37	126.34	505.34	634.10	125.51	0.00	1081.19	910.08	0.467	0.91	0.92	6.575	A
East	63.86	15.96	63.86	82.57	548.28	0.00	836.50	466.29	0.076	0.10	0.10	5.525	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	601.42	150.35	604.42	452.41	48.67	0.00	1125.66	1060.31	0.534	1.95	1.20	7.152	A
West	120.46	30.12	120.72	150.78	502.30	0.00	863.12	610.19	0.140	0.23	0.17	5.042	A
South	412.63	103.16	413.73	520.24	102.79	0.00	1094.34	910.08	0.377	0.92	0.64	5.574	A
East	52.14	13.04	52.24	67.67	448.85	0.00	894.05	466.29	0.058	0.10	0.07	5.072	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	503.66	125.91	505.11	378.60	40.73	0.00	1130.26	1060.31	0.446	1.20	0.84	5.944	A
West	100.88	25.22	101.04	126.05	419.78	0.00	910.87	610.19	0.111	0.17	0.13	4.623	A
South	345.56	86.39	346.20	434.83	85.99	0.00	1104.06	910.08	0.313	0.64	0.48	5.002	A
East	43.67	10.92	43.73	56.59	375.60	0.00	936.45	466.29	0.047	0.07	0.06	4.784	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.79	0.79	5.854	A	A
West	1.88	0.13	4.601	A	A
South	6.91	0.46	4.966	A	A
East	0.84	0.06	4.771	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.84	1.12	7.034	A	A
West	2.46	0.16	5.022	A	A
South	9.24	0.62	5.543	A	A
East	1.08	0.07	5.064	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	27.29	1.82	9.529	A	A
West	3.42	0.23	5.722	A	A
South	13.24	0.88	6.547	A	A

East	1.43	0.10	5.520	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	29.11	1.94	9.674	A	A
West	3.51	0.23	5.739	A	A
South	13.72	0.91	6.575	A	A
East	1.46	0.10	5.525	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	18.79	1.25	7.152	A	A
West	2.60	0.17	5.042	A	A
South	9.91	0.66	5.574	A	A
East	1.13	0.08	5.072	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.95	0.86	5.944	A	A
West	1.99	0.13	4.623	A	A
South	7.41	0.49	5.002	A	A
East	0.89	0.06	4.784	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.16	0.00	0.00	1.03	2.06			N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.63	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.92	0.00	0.00	0.00	2.06			N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.91	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.95	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.92	0.00	0.00	0.00	1.05			N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.20	0.00	0.00	2.06	2.06			N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.64	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.84	0.00	0.00	1.03	2.06			N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2036)

Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	5	634	545	174	567	3	652	4	227	3	5	13
Future Volume (vph)	5	634	545	174	567	3	652	4	227	3	5	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1388	0
Flt Permitted	0.369			0.145			0.745			0.563		
Satd. Flow (perm)	646	3167	1340	223	3105	0	1229	1395	0	985	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			592					247			14	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	5	689	592	189	619	3	709	4	247	3	5	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	689	592	189	619	0	709	251	0	3	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2036)

Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.02	0.95	0.77	1.01	0.59		1.00	0.28		0.01	0.02	
Control Delay	24.4	65.6	11.0	99.0	34.3		60.2	2.3		10.3	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	65.6	11.0	99.0	34.3		60.2	2.3		10.3	5.8	
LOS	C	E	B	F	C		E	A		B	A	
Approach Delay		40.3			49.4			45.0			6.4	
Approach LOS		D			D			D			A	
Queue Length 50th (m)	0.8	83.2	0.0	-32.5	60.4		-157.9	0.4		0.3	0.5	
Queue Length 95th (m)	3.5	#121.1	40.2	#78.4	90.1		#245.4	11.3		1.6	3.8	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	222	729	764	188	1050		706	906		566	803	
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	0.02	0.95	0.77	1.01	0.59		1.00	0.28		0.01	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.01

Intersection Signal Delay: 43.9

Intersection LOS: D

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Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

Intersection Capacity Utilization 87.1%	ICU Level of Service E
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	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 (vph)	5	634	545	174	567	3	652	4	227	3	5	13
Future Volume (vph)	5	634	545	174	567	3	652	4	227	3	5	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1396		1662	1388	
Flt Permitted	0.37	1.00	1.00	0.15	1.00		0.75	1.00		0.56	1.00	
Satd. Flow (perm)	646	3167	1340	223	3106		1229	1396		986	1388	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	689	592	189	616	3	709	4	247	3	5	14
RTOR Reduction (vph)	0	0	443	0	0	0	0	110	0	0	6	0
Lane Group Flow (vph)	5	689	149	189	619	0	709	141	0	3	13	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	796	337	183	1050		680	772		545	768	
v/s Ratio Prot	0.00	0.22		c0.09	0.20			0.10			0.01	
v/s Ratio Perm	0.01		0.11	c0.25			c0.58			0.00		
v/c Ratio	0.04	0.87	0.44	1.03	0.59		1.04	0.18		0.01	0.02	
Uniform Delay, d1	35.9	40.4	35.6	32.6	30.9		25.2	12.5		11.3	11.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	12.1	4.2	75.4	2.4		46.1	0.5		0.0	0.0	
Delay (s)	36.1	52.6	39.7	108.0	33.3		71.3	13.0		11.3	11.4	
Level of Service	D	D	D	F	C		E	B		B	B	
Approach Delay (s)		46.6			50.8			56.1			11.4	
Approach LOS		D			D			E			B	
Intersection Summary												
HCM 2000 Control Delay		50.4										
HCM 2000 Volume to Capacity ratio		1.02										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		87.1%								E		
Analysis Period (min)		15										

c Critical Lane Group

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	1	0	605	403	3
Future Volume (vph)	0	1	0	605	403	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.850
Fit Protected						
Satd. Flow (prot)	1514	0	0	1620	1562	1488
Fit Permitted						
Satd. Flow (perm)	1514	0	0	1620	1562	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	8%	12%	0%
Adj. Flow (vph)	0	1	0	658	438	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	658	438	3
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 44.6%
Analysis Period (min) 15

ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	1	0	605	403	3
Future Volume (Veh/h)	0	1	0	605	403	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	658	438	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1096	438	441			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1096	438	441			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	238	623	1130			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	1	658	438	3
Volume Left	0	0	0	0
Volume Right	1	0	0	3
cSH	623	1130	1700	1700
Volume to Capacity	0.00	0.00	0.26	0.00
Queue Length 95th (m)	0.0	0.0	0.0	0.0
Control Delay (s)	10.8	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.8	0.0	0.0	
Approach LOS	B			

Intersection Summary

Average Delay 0.0
Intersection Capacity Utilization 44.6%
Analysis Period (min) 15

ICU Level of Service

A

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	6	1	1	3	0	9	4	598	4	1	387	4
Future Volume (vph)	6	1	1	3	0	9	4	598	4	1	387	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0			1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.985			0.896				0.850			0.850
Flt Protected		0.963			0.989							
Satd. Flow (prot)	0	1321	0	0	1551	0	0	1606	1488	0	1563	1488
Flt Permitted		0.963			0.989							
Satd. Flow (perm)	0	1321	0	0	1551	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			922.6
Travel Time (s)		83.0			10.0				123.3			66.4
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	7	1	1	3	0	10	4	650	4	1	421	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	13	0	0	654	4	0	422	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 51.1%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	6	1	1	3	0	9	4	598	4	1	387	4
Future Volume (Veh/h)	6	1	1	3	0	9	4	598	4	1	387	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	1	1	3	0	10	4	650	4	1	421	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1091	1085	421	1082	1085	650	425			654		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1091	1085	421	1082	1085	650	425			654		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	100	100	98	100	98	100			100		
cM capacity (veh/h)	164	217	637	195	217	473	1145			943		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	13	654	4	422	4						
Volume Left	7	3	4	0	1	0						
Volume Right	1	10	0	4	0	4						
cSH	184	356	1145	1700	943	1700						
Volume to Capacity	0.05	0.04	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	1.2	0.9	0.1	0.0	0.0	0.0						
Control Delay (s)	25.6	15.5	0.1	0.0	0.0	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	25.6	15.5	0.1		0.0							
Approach LOS	D	C										

Intersection Summary

Average Delay 0.5

Intersection Capacity Utilization 51.1%

ICU Level of Service

A

Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	5	10	0	3	3	592	3	1	391	0
Future Volume (vph)	1	0	5	10	0	3	3	592	3	1	391	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.887			0.971				0.850			
Flt Protected		0.992			0.962							
Satd. Flow (prot)	0	1540	0	0	1577	0	0	1606	1118	0	1560	1750
Flt Permitted		0.992			0.962							
Satd. Flow (perm)	0	1540	0	0	1577	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	5	11	0	3	3	643	3	1	425	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	14	0	0	646	3	0	426	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	46.4%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	5	10	0	3	3	592	3	1	391	0
Future Volume (Veh/h)	1	0	5	10	0	3	3	592	3	1	391	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	5	11	0	3	3	643	3	1	425	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1079	1079	425	1081	1076	643	425			646		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1079	1079	425	1081	1076	643	425			646		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	99	100	99	100			100		
cM capacity (veh/h)	196	219	634	195	220	448	1145			606		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	14	646	3	426	0
Volume Left	1	11	3	0	1	0
Volume Right	5	3	0	3	0	0
cSH	462	222	1145	1700	606	1700
Volume to Capacity	0.01	0.06	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.3	1.6	0.1	0.0	0.0	0.0
Control Delay (s)	12.9	22.3	0.1	0.0	0.0	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	12.9	22.3	0.1		0.0	
Approach LOS	B	C				

Intersection Summary

Average Delay	0.4
Intersection Capacity Utilization	46.4%
Analysis Period (min)	15
ICU Level of Service	A

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	19	8	0	33	11	24	4	552	30	34	351	24
Future Volume (vph)	19	8	0	33	11	24	4	552	30	34	351	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			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					0.953				0.850			0.850
Flt Protected	0.966				0.976		0.950			0.950		
Satd. Flow (prot)	0	1294	0	0	1274	0	1662	1636	1305	1087	1606	1118
Flt Permitted	0.814				0.835		0.525			0.393		
Satd. Flow (perm)	0	1091	0	0	1090	0	919	1636	1305	450	1606	1118
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26				39			39
Link Speed (k/h)	50				50				50			50
Link Distance (m)	388.1				2359.9				455.1			2151.0
Travel Time (s)	27.9				169.9				32.8			154.9
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Adj. Flow (vph)	21	9	0	36	12	26	4	600	33	37	382	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	74	0	4	600	33	37	382	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				3.6			3.6
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4				9.4			9.4
Detector 2 Size(m)		0.6			0.6				0.6			0.6
Detector 2 Type		CI+Ex			CI+Ex				CI+Ex			CI+Ex
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0				0.0			0.0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2				6

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)		12.6			12.6		51.9	51.9	51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.18			0.18		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio		0.15			0.33		0.01	0.48	0.03	0.11	0.31	0.03
Control Delay		25.5			22.0		3.5	6.2	1.3	4.5	4.7	1.0
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		25.5			22.0		3.5	6.2	1.3	4.5	4.7	1.0
LOS		C			C		A	A	A	A	A	A
Approach Delay		25.5			22.0			5.9			4.5	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		3.4			5.6		0.2	29.5	0.0	1.3	15.7	0.0
Queue Length 95th (m)		10.3			16.8		0.9	58.3	2.0	4.6	31.2	1.5
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)							110.0		190.0	55.0		15.0
Base Capacity (vph)		431			446		697	1241	1000	341	1219	858
Starvation Cap Reductn		0			0		0	0	0	0	0	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.07			0.17		0.01	0.48	0.03	0.11	0.31	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length: 83												
Actuated Cycle Length: 68.4												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.48												
Intersection Signal Delay: 6.9				Intersection LOS: A								
Intersection Capacity Utilization 46.5%				ICU Level of Service A								
Analysis Period (min) 15												

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 6: Highway 140 & Concession 2 Road

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

AM - Background (2036)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	19	8	0	33	11	24	4	552	30	34	351	24
Future Volume (vph)	19	8	0	33	11	24	4	552	30	34	351	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1295			1274		1662	1636	1305	1087	1606	1118
Flt Permitted		0.81			0.83		0.52	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)		1090			1089		919	1636	1305	449	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	9	0	36	12	26	4	600	33	37	382	26
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	9	0	0	7
Lane Group Flow (vph)	0	30	0	0	52	0	4	600	24	37	382	19
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.5			8.5		48.1	48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.5			10.5		51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15		0.73	0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		164			164		674	1201	958	329	1179	820
v/s Ratio Prot								c0.37			0.24	
v/s Ratio Perm		0.03			c0.05		0.00		0.02	0.08		0.02
v/c Ratio		0.18			0.32		0.01	0.50	0.03	0.11	0.32	0.02
Uniform Delay, d1		25.8			26.4		2.5	3.9	2.5	2.7	3.2	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.1		0.0	1.5	0.0	0.7	0.7	0.1
Delay (s)		26.3			27.5		2.5	5.4	2.6	3.4	4.0	2.6
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.3			27.5			5.2			3.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.6			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.47										
Actuated Cycle Length (s)		69.6			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		46.5%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

1: Highway 140 & Regional Road 27

Nyon Marine Fueling Corp Phase 1 TIS

1: Highway 140 & Regional Road 27

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	723	680	242	824	5	614	4	221	0	3	20
Future Volume (vph)	14	723	680	242	824	5	614	4	221	0	3	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.868	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1375	0	1750	1403	0
Flt Permitted	0.196			0.139			0.741					
Satd. Flow (perm)	327	3197	1430	236	3164	0	1234	1375	0	1750	1403	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			739		1			228			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			3375.6			350.8	
Travel Time (s)		80.9			139.5			243.0			25.3	
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	15	786	739	263	896	5	667	4	240	0	3	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	786	739	263	901	0	667	244	0	0	25	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

1: Highway 140 & Regional Road 27

Nyon Marine Fueling Corp Phase 1 TIS

1: Highway 140 & Regional Road 27

														
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA			
Protected Phases	7	4		3	8			2			6			
Permitted Phases	4		4	8			2			6				
Detector Phase	7	4	4	3	8		2	2		6	6			
Switch Phase														
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0			
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0			
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9			
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%			
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9			
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0			
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0			
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0			
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0			
Lead/Lag	Lead	Lag	Lag	Lead	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes									
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0			
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max			
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0			
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0			
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0			
Act Effect Green (s)	41.0	36.0	36.0	49.0	45.4		55.9	55.9			55.9			
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.40		0.50	0.50			0.50			
v/c Ratio	0.09	0.77	0.77	1.24	0.71		1.09	0.31			0.04			
Control Delay	19.7	40.8	8.6	166.5	32.8		93.5	3.7			6.6			
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0			
Total Delay	19.7	40.8	8.6	166.5	32.8		93.5	3.7			6.6			
LOS	B	D	A	F	C		F	A			A			
Approach Delay		25.1			63.0			69.5			6.6			
Approach LOS		C			E			E			A			
Queue Length 50th (m)	1.9	86.4	0.0	~55.4	85.2		~175.1	1.8			0.4			
Queue Length 95th (m)	6.1	110.5	38.5	#109.7	124.9		#247.2	15.2			4.9			
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8			
Turn Bay Length (m)	130.0		100.0	180.0			300.0							
Base Capacity (vph)	174	1019	959	212	1272		610	795			705			
Starvation Cap Reductn	0	0	0	0	0		0	0			0			
Spillback Cap Reductn	0	0	0	0	0		0	0			0			
Storage Cap Reductn	0	0	0	0	0		0	0			0			
Reduced v/c Ratio	0.09	0.77	0.77	1.24	0.71		1.09	0.31			0.04			

Intersection Summary

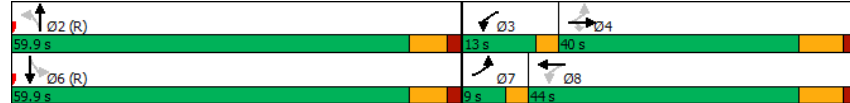
Area Type:	Other
Cycle Length:	112.9
Actuated Cycle Length:	112.9
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.24
Intersection Signal Delay:	48.2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

Intersection Capacity Utilization 100.3%	ICU Level of Service G
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	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 (vph)	14	723	680	242	824	5	614	4	221	0	3	20
Future Volume (vph)	14	723	680	242	824	5	614	4	221	0	3	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.87
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1375				1403
Flt Permitted	0.20	1.00	1.00	0.14	1.00		0.74	1.00				1.00
Satd. Flow (perm)	326	3197	1430	236	3165		1234	1375				1403
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	786	739	263	896	5	667	4	240	0	3	22
RTOR Reduction (vph)	0	0	492	0	1	0	0	119	0	0	11	0
Lane Group Flow (vph)	15	786	247	263	900	0	667	125	0	0	14	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8		2				6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1	
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1	
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	114	1070	478	205	1272		591	658			672	
v/s Ratio Prot	0.00	0.25		c0.10	0.28			0.09			0.01	
v/s Ratio Perm	0.04		0.17	c0.42			c0.54					
v/c Ratio	0.13	0.73	0.52	1.28	0.71		1.13	0.19			0.02	
Uniform Delay, d1	28.3	33.1	30.2	27.7	28.2		29.4	16.8			15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	4.5	4.0	159.2	3.3		77.8	0.6			0.1	
Delay (s)	29.1	37.6	34.2	186.9	31.6		107.2	17.5			15.5	
Level of Service	C	D	C	F	C		F	B			B	
Approach Delay (s)		35.9			66.7			83.1			15.5	
Approach LOS		D			E			F			B	
Intersection Summary												
HCM 2000 Control Delay		57.4										
HCM 2000 Volume to Capacity ratio		1.17										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		100.3%								G		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	497	634	3
Future Volume (vph)	1	0	0	497	634	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.850	
Flt Protected	0.950					
Satd. Flow (prot)	1662	0	0	1683	1716	1488
Flt Permitted	0.950					
Satd. Flow (perm)	1662	0	0	1683	1716	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	2%	0%
Adj. Flow (vph)	1	0	0	540	689	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	540	689	3
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	497	634	3
Future Volume (Veh/h)	1	0	0	497	634	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	540	689	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1229	689	692			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1229	689	692			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	198	449	912			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	540	689	3		
Volume Left	1	0	0	0		
Volume Right	0	0	0	3		
cSH	198	912	1700	1700		
Volume to Capacity	0.01	0.00	0.41	0.00		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	23.2	0.0	0.0	0.0		
Lane LOS	C					
Approach Delay (s)	23.2	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			46.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	→	↙	↘	→	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	9	0	8	9	4	6	6	514	8	5	530	9
Future Volume (vph)	9	0	8	9	4	6	6	514	8	5	530	9
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.936			0.955				0.850			0.850
Flt Protected		0.974			0.977			0.999				
Satd. Flow (prot)	0	1595	0	0	1633	0	0	1682	1488	0	1697	1488
Flt Permitted		0.974			0.977			0.999				
Satd. Flow (perm)	0	1595	0	0	1633	0	0	1682	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			922.6	
Travel Time (s)		83.0			10.0			123.3			66.4	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	10	0	9	10	4	7	7	559	9	5	576	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	21	0	0	566	9	0	581	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 47.3%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	→	↙	↘	→	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	9	0	8	9	4	6	6	514	8	5	530	9
Future Volume (Veh/h)	9	0	8	9	4	6	6	514	8	5	530	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	10	0	9	10	4	7	7	559	9	5	576	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1168	1168	576	1168	1169	559	586			568		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1168	1168	576	1168	1169	559	586			568		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	94	100	98	94	98	99	99			99		
cM capacity (veh/h)	165	193	521	167	192	532	999			934		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	19	21	566	9	581	10
Volume Left	10	10	7	0	5	0
Volume Right	9	7	0	9	0	10
cSH	244	224	999	1700	934	1700
Volume to Capacity	0.08	0.09	0.01	0.01	0.01	0.01
Queue Length 95th (m)	2.0	2.5	0.2	0.0	0.1	0.0
Control Delay (s)	21.0	22.7	0.2	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	21.0	22.7	0.2		0.1	
Approach LOS	C	C				

Intersection Summary

Average Delay 0.9
Intersection Capacity Utilization 47.3% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	4	1	1	3	0	4	4	531	10	6	540	3
Future Volume (vph)	4	1	1	3	0	4	4	531	10	6	540	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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			0.923				0.850			0.850
Flt Protected		0.968			0.979						0.999	
Satd. Flow (prot)	0	1655	0	0	1385	0	0	1683	1271	0	1714	1488
Flt Permitted		0.968			0.979						0.999	
Satd. Flow (perm)	0	1655	0	0	1385	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	4	1	1	3	0	4	4	577	11	7	587	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	7	0	0	581	11	0	594	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 47.9%	ICU Level of Service A											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	4	1	1	3	0	4	4	531	10	6	540	3
Future Volume (Veh/h)	4	1	1	3	0	4	4	531	10	6	540	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	1	1	3	0	4	4	577	11	7	587	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1190	1197	587	1188	1189	577	590			588		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1190	1197	587	1188	1189	577	590			588		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	100	98	100	99	100			99		
cM capacity (veh/h)	163	185	513	141	187	520	995			997		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	7	581	11	594	3
Volume Left	4	3	4	0	7	0
Volume Right	1	4	0	11	0	3
cSH	189	242	995	1700	997	1700
Volume to Capacity	0.03	0.03	0.00	0.01	0.01	0.00
Queue Length 95th (m)	0.8	0.7	0.1	0.0	0.2	0.0
Control Delay (s)	24.7	20.3	0.1	0.0	0.2	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	24.7	20.3	0.1	0.2		
Approach LOS	C	C				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	27	8	5	63	13	19	0	497	53	24	488	29
Future Volume (vph)	27	8	5	63	13	19	0	497	53	24	488	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt		0.984			0.972				0.850			0.850
Flt Protected		0.967			0.968				0.950			
Satd. Flow (prot)	0	1502	0	0	1607	0	1716	1681	1400	1395	1709	1458
Flt Permitted		0.806			0.775				0.425			
Satd. Flow (perm)	0	1250	0	0	1287	0	1716	1681	1400	624	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			16				58			39
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		388.1			2359.9			455.1			2151.0	
Travel Time (s)		27.9			169.9			32.8			154.9	
Confl. Peds. (#/hr)	1					1						
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
Bus Blockages (#/hr)	0	20	0	0	9	0	29	0	5	10	36	1
Adj. Flow (vph)	29	9	5	68	14	21	0	540	58	26	530	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	103	0	0	540	58	26	530	32
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

PTSL (200364)

Synchro 11 Report
Page 11

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			2	6	
Detector Phase	4	4		8	8		2	2		2	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0		22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0		52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0		-2.0			-3.0	-3.0		-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max		Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		13.2			13.2			51.9		51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.75		0.75	0.75	0.75
v/c Ratio		0.18			0.40			0.43		0.05	0.06	0.41
Control Delay		23.1			25.9			5.9		1.4	4.2	5.8
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		23.1			25.9			5.9		1.4	4.2	5.8
LOS		C			C			A		A	A	A
Approach Delay		23.1			25.9			5.5			5.4	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		4.4			10.4			24.8		0.0	0.9	24.0
Queue Length 95th (m)		12.3			23.8			53.0		3.2	3.6	50.9
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)								190.0		55.0		15.0
Base Capacity (vph)		492			513			1265		1068	469	1286
Starvation Cap Reductn		0			0			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.09			0.20			0.43		0.05	0.06	0.41
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		69										
Natural Cycle:		50										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.43										
Intersection Signal Delay:		7.6						Intersection LOS: A				
Intersection Capacity Utilization		43.6%						ICU Level of Service A				

PTSL (200364)

Synchro 11 Report
Page 12

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

PM - Background (2036)
Nyon Marine Fueling Corp Phase 1 TIS

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	27	8	5	63	13	19	0	497	53	24	488	29	
Future Volume (vph)	27	8	5	63	13	19	0	497	53	24	488	29	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00	
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85	
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1501			1608			1681	1400	1395	1709	1458	
Flt Permitted		0.81			0.77			1.00	1.00	0.42	1.00	1.00	
Satd. Flow (perm)		1251			1287			1681	1400	624	1709	1458	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	29	9	5	68	14	21	0	540	58	26	530	32	
RTOR Reduction (vph)	0	4	0	0	13	0	0	0	16	0	0	9	
Lane Group Flow (vph)	0	39	0	0	90	0	0	540	42	26	530	23	
Confl. Peds. (#/hr)	1					1							
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2		6		6	
Permitted Phases	4			8			2		2	6		6	
Actuated Green, G (s)		9.1			9.1			48.1	48.1	48.1	48.1	48.1	
Effective Green, g (s)		11.1			11.1			51.1	51.1	51.1	51.1	51.1	
Actuated g/C Ratio		0.16			0.16			0.73	0.73	0.73	0.73	0.73	
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)		197			203			1223	1019	454	1244	1061	
v/s Ratio Prot								c0.32			0.31		
v/s Ratio Perm		0.03			c0.07				0.03	0.04		0.02	
v/c Ratio		0.20			0.44			0.44	0.04	0.06	0.43	0.02	
Uniform Delay, d1		25.7			26.7			3.8	2.7	2.7	3.8	2.6	
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.5			1.5			1.2	0.1	0.2	1.1	0.0	
Delay (s)		26.2			28.3			5.0	2.8	3.0	4.8	2.7	
Level of Service		C			C			A	A	A	A	A	
Approach Delay (s)		26.2			28.3			4.8			4.6		
Approach LOS		C			C			A			A		
Intersection Summary													
HCM 2000 Control Delay		7.2			HCM 2000 Level of Service			A					
HCM 2000 Volume to Capacity ratio		0.44											
Actuated Cycle Length (s)		70.2			Sum of lost time (s)			8.0					
Intersection Capacity Utilization		43.6%			ICU Level of Service			A					
Analysis Period (min)		15											

c Critical Lane Group

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:56:59 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - BG 2036						
Leg North	1.07	?	6.65	0.49	A	7.34	A
Leg West	0.24	~1	4.82	0.19	A		
Leg South	1.60	1.08	8.77	0.60	A		
Leg East	0.11	~1	5.89	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:56:58 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - BG 2036, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2036, AM	BG 2036	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				7.34	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	531.29	100.000
West	ONE HOUR	✓	166.11	100.000
South	ONE HOUR	✓	604.84	100.000
East	ONE HOUR	✓	62.13	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.000	125.532	355.040	50.720
	West	124.264	0.000	39.308	2.536
	South	545.240	34.236	0.000	25.360
	East	50.720	0.000	11.412	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.24	0.67	0.10
	West	0.75	0.00	0.24	0.02
	South	0.90	0.06	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.49	6.65	1.07	?	A	487.52	731.28	70.71	5.80	0.79	70.72	5.80
West	0.19	4.82	0.24	~1	A	152.42	228.64	16.90	4.44	0.19	16.90	4.44
South	0.60	8.77	1.60	1.08	A	555.01	832.51	98.19	7.08	1.09	98.21	7.08
East	0.09	5.89	0.11	~1	A	57.01	85.52	7.58	5.32	0.08	7.58	5.32

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	399.98	100.00	397.76	539.05	34.16	0.00	1201.93	1145.15	0.333	0.00	0.56	5.018	A
West	125.05	31.26	124.49	119.60	312.33	0.00	1040.94	667.27	0.120	0.00	0.14	4.065	A
South	455.35	113.84	452.53	303.81	133.00	0.00	1144.72	863.63	0.398	0.00	0.71	5.593	A
East	46.78	11.69	46.53	58.85	526.69	0.00	916.88	453.92	0.051	0.00	0.06	4.770	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	477.62	119.41	476.89	646.27	40.96	0.00	1198.00	1145.15	0.399	0.56	0.74	5.603	A
West	149.33	37.33	149.17	143.39	374.46	0.00	1004.98	667.27	0.149	0.14	0.18	4.356	A

South	543.74	135.93	542.60	364.23	159.40	0.00	1129.45	863.63	0.481	0.71	0.99	6.609	A
East	55.86	13.96	55.78	70.55	631.45	0.00	856.24	453.92	0.065	0.06	0.08	5.188	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	584.96	146.24	583.65	790.53	50.10	0.00	1192.70	1145.16	0.490	0.74	1.07	6.625	A
West	182.89	45.72	182.63	175.46	458.29	0.00	956.46	667.27	0.191	0.18	0.24	4.817	A
South	665.94	166.48	663.55	445.79	195.13	0.00	1108.77	863.63	0.601	0.99	1.59	8.682	A
East	68.41	17.10	68.28	86.33	772.35	0.00	774.69	453.92	0.088	0.08	0.11	5.879	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	584.96	146.24	584.93	792.91	50.25	0.00	1192.62	1145.16	0.490	1.07	1.07	6.655	A
West	182.89	45.72	182.88	175.90	459.29	0.00	955.88	667.27	0.191	0.24	0.24	4.822	A
South	665.94	166.48	665.86	446.73	195.45	0.00	1108.58	863.63	0.601	1.59	1.60	8.775	A
East	68.41	17.10	68.41	86.55	774.76	0.00	773.30	453.92	0.088	0.11	0.11	5.891	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	477.62	119.41	478.91	649.87	41.19	0.00	1197.86	1145.15	0.399	1.07	0.75	5.635	A
West	149.33	37.33	149.58	144.06	376.03	0.00	1004.07	667.27	0.149	0.24	0.18	4.365	A
South	543.74	135.93	546.09	365.71	159.90	0.00	1129.16	863.63	0.482	1.60	1.02	6.691	A
East	55.86	13.96	55.98	70.90	635.09	0.00	854.14	453.92	0.065	0.11	0.08	5.205	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	399.98	100.00	400.73	543.47	34.45	0.00	1201.76	1145.15	0.333	0.75	0.57	5.055	A
West	125.05	31.26	125.21	120.53	314.66	0.00	1039.59	667.27	0.120	0.18	0.14	4.079	A
South	455.35	113.84	456.54	306.03	133.84	0.00	1144.24	863.63	0.398	1.02	0.72	5.660	A
East	46.78	11.69	46.85	59.31	531.06	0.00	914.34	453.92	0.051	0.08	0.06	4.787	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.08	0.54	5.018	A	A
West	2.06	0.14	4.065	A	A
South	10.21	0.68	5.593	A	A
East	0.90	0.06	4.770	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.80	0.72	5.603	A	A
West	2.65	0.18	4.356	A	A
South	14.38	0.96	6.609	A	A
East	1.18	0.08	5.188	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.49	1.03	6.625	A	A
West	3.58	0.24	4.817	A	A
South	22.69	1.51	8.682	A	A

East	1.63	0.11	5.879	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.06	1.07	6.655	A	A
West	3.66	0.24	4.822	A	A
South	23.97	1.60	8.775	A	A
East	1.67	0.11	5.891	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.61	0.77	5.635	A	A
West	2.78	0.19	4.365	A	A
South	15.83	1.06	6.691	A	A
East	1.24	0.08	5.205	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.67	0.58	5.055	A	A
West	2.17	0.14	4.079	A	A
South	11.12	0.74	5.660	A	A
East	0.95	0.06	4.787	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.56	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.74	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.99	0.00	0.00	1.08	1.08			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.07	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
						Percentiles could not be calculated. This may			

South	1.59	?	?	?	?	be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.07	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.60	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.75	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.02	0.00	0.00	1.08	1.08			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.57	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.72	0.00	0.00	0.00	1.08			N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:57:19 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - BG 2036						
Leg North	2.22	3.09	9.96	0.69	A	8.08	A
Leg West	0.25	~1	5.61	0.20	A		
Leg South	0.97	1.05	6.39	0.48	A		
Leg East	0.11	~1	5.30	0.08	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:57:19 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - BG 2036, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2036, PM	BG 2036	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				8.08	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	739.00	100.000
West	ONE HOUR	✓	148.00	100.000
South	ONE HOUR	✓	498.00	100.000
East	ONE HOUR	✓	65.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	134.000	568.000	37.000
	West	86.000	0.000	58.000	4.000
	South	408.000	47.000	0.000	43.000
	East	55.000	0.000	10.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.18	0.77	0.05
	West	0.58	0.00	0.39	0.03
	South	0.82	0.09	0.00	0.09
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.69	9.96	2.22	3.09	A	678.12	1017.18	129.70	7.65	1.44	129.72	7.65
West	0.20	5.61	0.25	~1	A	135.81	203.71	17.00	5.01	0.19	17.00	5.01
South	0.48	6.39	0.97	1.05	A	456.97	685.46	63.35	5.55	0.70	63.36	5.55
East	0.08	5.30	0.11	~1	A	59.65	89.47	7.33	4.91	0.08	7.33	4.91

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	556.36	139.09	552.82	411.17	42.69	0.00	1196.99	1124.96	0.465	0.00	0.88	5.725	A
West	111.42	27.86	110.88	135.44	460.07	0.00	955.43	644.50	0.117	0.00	0.14	4.428	A
South	374.92	93.73	372.94	475.84	95.10	0.00	1166.66	962.27	0.321	0.00	0.49	4.761	A
East	48.94	12.23	48.69	62.88	405.17	0.00	987.21	496.12	0.050	0.00	0.06	4.548	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	664.35	166.09	662.78	492.85	51.17	0.00	1192.09	1124.96	0.557	0.88	1.27	6.983	A
West	133.05	33.26	132.88	162.37	551.58	0.00	902.47	644.50	0.147	0.14	0.18	4.861	A

South	447.69	111.92	447.03	570.47	113.99	0.00	1155.73	962.27	0.387	0.49	0.66	5.341	A
East	58.43	14.61	58.37	75.37	485.65	0.00	940.63	496.12	0.062	0.06	0.08	4.839	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	813.65	203.41	810.03	603.21	62.63	0.00	1185.45	1124.97	0.686	1.27	2.18	9.781	A
West	162.95	40.74	162.66	198.51	674.14	0.00	831.53	644.50	0.196	0.18	0.25	5.592	A
South	548.31	137.08	547.10	697.33	139.47	0.00	1140.98	962.27	0.481	0.66	0.96	6.365	A
East	71.57	17.89	71.46	92.19	594.38	0.00	877.70	496.12	0.082	0.08	0.10	5.295	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	813.65	203.41	813.51	604.43	62.76	0.00	1185.38	1124.97	0.686	2.18	2.22	9.960	A
West	162.95	40.74	162.95	199.26	677.01	0.00	829.87	644.50	0.196	0.25	0.25	5.610	A
South	548.31	137.08	548.28	700.14	139.82	0.00	1140.78	962.27	0.481	0.96	0.97	6.392	A
East	71.57	17.89	71.56	92.48	595.63	0.00	876.98	496.12	0.082	0.10	0.11	5.300	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	664.35	166.09	667.93	494.76	51.37	0.00	1191.97	1124.96	0.557	2.22	1.32	7.122	A
West	133.05	33.26	133.33	163.48	555.83	0.00	900.01	644.50	0.148	0.25	0.18	4.884	A
South	447.69	111.92	448.87	574.64	114.52	0.00	1155.42	962.27	0.387	0.97	0.67	5.371	A
East	58.43	14.61	58.54	75.80	487.59	0.00	939.50	496.12	0.062	0.11	0.08	4.848	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	556.36	139.09	558.01	414.03	42.99	0.00	1196.82	1124.96	0.465	1.32	0.91	5.818	A
West	111.42	27.86	111.59	136.63	464.37	0.00	952.94	644.50	0.117	0.18	0.14	4.450	A
South	374.92	93.73	375.60	480.16	95.80	0.00	1166.26	962.27	0.321	0.67	0.50	4.794	A
East	48.94	12.23	49.00	63.39	408.01	0.00	985.56	496.12	0.050	0.08	0.06	4.558	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.74	0.85	5.725	A	A
West	2.00	0.13	4.428	A	A
South	7.20	0.48	4.761	A	A
East	0.90	0.06	4.548	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	18.45	1.23	6.983	A	A
West	2.63	0.18	4.861	A	A
South	9.66	0.64	5.341	A	A
East	1.15	0.08	4.839	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	30.78	2.05	9.781	A	A
West	3.69	0.25	5.592	A	A
South	13.97	0.93	6.365	A	A

East	1.54	0.10	5.295	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	33.04	2.20	9.960	A	A
West	3.79	0.25	5.610	A	A
South	14.47	0.96	6.392	A	A
East	1.57	0.10	5.300	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	20.68	1.38	7.122	A	A
West	2.78	0.19	4.884	A	A
South	10.35	0.69	5.371	A	A
East	1.21	0.08	4.848	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.01	0.93	5.818	A	A
West	2.11	0.14	4.450	A	A
South	7.70	0.51	4.794	A	A
East	0.95	0.06	4.558	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.88	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.49	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.27	0.00	0.00	2.06	3.09			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.18	0.00	0.00	0.00	3.09			N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.96	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.22	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.97	0.00	0.00	0.00	1.05			N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.32	0.00	0.00	2.06	3.09			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.67	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.91	0.00	0.00	1.03	2.06			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.50	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2041)

Nyron Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	6	700	602	192	626	3	720	4	251	3	6	14
Future Volume (vph)	6	700	602	192	626	3	720	4	251	3	6	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.898	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1413	0
Flt Permitted	0.311			0.145			0.743			0.541		
Satd. Flow (perm)	544	3167	1340	223	3105	0	1226	1395	0	947	1413	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			654					273			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	7	761	654	209	683	3	783	4	273	3	7	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	761	654	209	683	0	783	277	0	3	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Synchro 11 Report
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Background (2041)

Nyron Marine Fuelling Corp Phase 1 TIS

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.04	1.04	0.81	1.11	0.65		1.11	0.30		0.01	0.03	
Control Delay	24.5	88.0	11.9	129.2	35.9		94.3	2.3		10.3	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.5	88.0	11.9	129.2	35.9		94.3	2.3		10.3	6.0	
LOS	C	F	B	F	D		F	A		B	A	
Approach Delay		52.7			57.7			70.2			6.5	
Approach LOS		D			E			E			A	
Queue Length 50th (m)	1.0	~101.0	0.0	~40.7	68.5		~208.5	0.4		0.3	0.7	
Queue Length 95th (m)	4.4	#140.2	45.1	#90.2	101.1		#284.1	11.8		1.6	4.2	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	198	729	811	188	1050		704	917		544	818	
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	1.04	0.81	1.11	0.65		1.11	0.30		0.01	0.03	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 59.1

Intersection LOS: E

PTSL 200364

Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

Intersection Capacity Utilization 92.5%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	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 (vph)	6	700	602	192	626	3	720	4	251	3	6	14
Future Volume (vph)	6	700	602	192	626	3	720	4	251	3	6	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1413	
Flt Permitted	0.31	1.00	1.00	0.15	1.00		0.74	1.00		0.54	1.00	
Satd. Flow (perm)	545	3167	1340	223	3106		1226	1395		946	1413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	761	654	209	680	3	783	4	273	3	7	15
RTOR Reduction (vph)	0	0	489	0	0	0	0	122	0	0	7	0
Lane Group Flow (vph)	7	761	165	209	683	0	783	155	0	3	15	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	116	796	337	183	1050		678	772		523	782	
v/s Ratio Prot	0.00	0.24		c0.10	0.22			0.11			0.01	
v/s Ratio Perm	0.01		0.12	c0.28			c0.64			0.00		
v/c Ratio	0.06	0.96	0.49	1.14	0.65		1.15	0.20		0.01	0.02	
Uniform Delay, d1	37.4	41.6	36.0	32.9	31.7		25.2	12.7		11.3	11.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	22.8	5.0	109.9	3.1		85.8	0.6		0.0	0.0	
Delay (s)	37.7	64.5	41.0	142.8	34.8		111.0	13.2		11.3	11.4	
Level of Service	D	E	D	F	C		F	B		B	B	
Approach Delay (s)		53.6			60.1			85.4			11.4	
Approach LOS		D			E			F			B	
Intersection Summary												
HCM 2000 Control Delay		64.9								E		
HCM 2000 Volume to Capacity ratio		1.12										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		92.5%								F		
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	1	0	668	445	3
Future Volume (vph)	0	1	0	668	445	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					0.850
Fit Protected						
Satd. Flow (prot)	1514	0	0	1620	1562	1488
Fit Permitted						
Satd. Flow (perm)	1514	0	0	1620	1562	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	8%	12%	0%
Adj. Flow (vph)	0	1	0	726	484	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	726	484	3
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	48.2%			ICU Level of Service A		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	0	1	0	668	445	3
Future Volume (Veh/h)	0	1	0	668	445	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1	0	726	484	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1210	484	487			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1210	484	487			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	204	587	1086			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	726	484	3		
Volume Left	0	0	0	0		
Volume Right	1	0	0	3		
cSH	587	1086	1700	1700		
Volume to Capacity	0.00	0.00	0.28	0.00		
Queue Length 95th (m)	0.0	0.0	0.0	0.0		
Control Delay (s)	11.1	0.0	0.0	0.0		
Lane LOS	B					
Approach Delay (s)	11.1	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			48.2%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	7	1	1	3	0	10	4	661	4	1	427	4
Future Volume (vph)	7	1	1	3	0	10	4	661	4	1	427	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0			1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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	0.986				0.894				0.850			0.850
Flt Protected	0.962				0.989							
Satd. Flow (prot)	0	1313	0	0	1547	0	0	1606	1488	0	1563	1488
Flt Permitted	0.962				0.989							
Satd. Flow (perm)	0	1313	0	0	1547	0	0	1606	1488	0	1563	1488
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	1152.3				139.3			1712.9			922.6	
Travel Time (s)	83.0				10.0			123.3			66.4	
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	8	1	1	3	0	11	4	718	4	1	464	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	14	0	0	722	4	0	465	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0			0.0			0.0	
Link Offset(m)	0.0				0.0			0.0			0.0	
Crosswalk Width(m)	4.8				4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 54.7%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	7	1	1	3	0	10	4	661	4	1	427	4
Future Volume (Veh/h)	7	1	1	3	0	10	4	661	4	1	427	4
Sign Control	Stop				Stop			Free			Free	
Grade	0%				0%			0%			0%	
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
Hourly flow rate (vph)	8	1	1	3	0	11	4	718	4	1	464	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1203	1196	464	1194	1196	718	468			722		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1203	1196	464	1194	1196	718	468			722		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	100	98	100	97	100			100		
cM capacity (veh/h)	136	187	602	164	187	432	1104			889		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	14	722	4	465	4
Volume Left	8	3	4	0	1	0
Volume Right	1	11	0	4	0	4
cSH	152	320	1104	1700	889	1700
Volume to Capacity	0.07	0.04	0.00	0.00	0.00	0.00
Queue Length 95th (m)	1.7	1.1	0.1	0.0	0.0	0.0
Control Delay (s)	30.4	16.8	0.1	0.0	0.0	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	30.4	16.8	0.1	0.0		
Approach LOS	D	C				

Intersection Summary

Average Delay 0.5
Intersection Capacity Utilization 54.7% ICU Level of Service A
Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	6	11	0	3	3	654	3	1	431	0
Future Volume (vph)	1	0	6	11	0	3	3	654	3	1	431	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.882			0.973				0.850			
Flt Protected		0.994			0.962							
Satd. Flow (prot)	0	1534	0	0	1584	0	0	1606	1118	0	1560	1750
Flt Permitted		0.994			0.962							
Satd. Flow (perm)	0	1534	0	0	1584	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	7	12	0	3	3	711	3	1	468	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	15	0	0	714	3	0	469	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 50.0%	ICU Level of Service A											
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	6	11	0	3	3	654	3	1	431	0
Future Volume (Veh/h)	1	0	6	11	0	3	3	654	3	1	431	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	7	12	0	3	3	711	3	1	468	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1190	1190	468	1194	1187	711	468			714		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1190	1190	468	1194	1187	711	468			714		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	93	100	99	100			100		
cM capacity (veh/h)	164	188	599	163	189	409	1104			565		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	15	714	3	469	0						
Volume Left	1	12	3	0	1	0						
Volume Right	7	3	0	3	0	0						
cSH	450	185	1104	1700	565	1700						
Volume to Capacity	0.02	0.08	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	0.4	2.1	0.1	0.0	0.0	0.0						
Control Delay (s)	13.1	26.2	0.1	0.0	0.1	0.0						
Lane LOS	B	D	A		A							
Approach Delay (s)	13.1	26.2	0.1		0.1							
Approach LOS	B	D										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			50.0%				ICU Level of Service			A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	21	8	0	36	13	27	4	609	34	38	388	27
Future Volume (vph)	21	8	0	36	13	27	4	609	34	38	388	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			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					0.952				0.850			0.850
Flt Protected	0.965				0.977		0.950			0.950		
Satd. Flow (prot)	0	1292	0	0	1275	0	1662	1636	1305	1087	1606	1118
Flt Permitted	0.828				0.836		0.499			0.358		
Satd. Flow (perm)	0	1108	0	0	1091	0	873	1636	1305	409	1606	1118
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					29				39			39
Link Speed (k/h)	50				50				50			50
Link Distance (m)	388.1				2359.9				455.1			2151.0
Travel Time (s)	27.9				169.9				32.8			154.9
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Adj. Flow (vph)	23	9	0	39	14	29	4	662	37	41	422	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	82	0	4	662	37	41	422	29
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			3.6
Link Offset(m)	0.0				0.0				0.0			0.0
Crosswalk Width(m)	4.8				4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

													
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)				11.0	11.0								
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effct Green (s)		12.7			12.7		51.9	51.9	51.9	51.9	51.9	51.9	
Actuated g/C Ratio		0.19			0.19		0.76	0.76	0.76	0.76	0.76	0.76	
v/c Ratio		0.16			0.36		0.01	0.53	0.04	0.13	0.35	0.03	
Control Delay		25.4			22.2		3.5	7.0	1.4	5.0	5.0	1.2	
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		25.4			22.2		3.5	7.0	1.4	5.0	5.0	1.2	
LOS		C			C		A	A	A	A	A	A	
Approach Delay		25.4			22.2			6.7			4.8		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		3.7			6.2		0.2	34.7	0.0	1.4	17.9	0.0	
Queue Length 95th (m)		10.6			18.0		1.0	71.4	2.4	5.4	36.8	1.8	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)		436			447		661	1238	997	309	1216	856	
Starvation Cap Reductn		0			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.07			0.18		0.01	0.53	0.04	0.13	0.35	0.03	
Intersection Summary													
Area Type:	Other												
Cycle Length:	83												
Actuated Cycle Length:	68.6												
Natural Cycle:	60												
Control Type:	Actuated-Uncoordinated												
Maximum v/c Ratio:	0.53												
Intersection Signal Delay:	7.4				Intersection LOS: A								
Intersection Capacity Utilization	49.8%				ICU Level of Service A								
Analysis Period (min)	15												

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 6: Highway 140 & Concession 2 Road

↑ Ø2	→ Ø4
52 s	31 s
↓ Ø6	← Ø8
52 s	31 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

AM - Background (2041)
Nyon Marine Fuelling Corp Phase 1 TIS

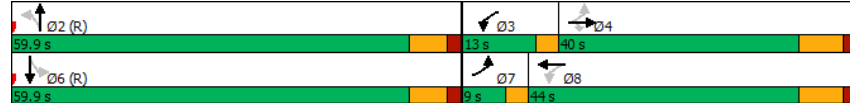
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	8	0	36	13	27	4	609	34	38	388	27
Future Volume (vph)	21	8	0	36	13	27	4	609	34	38	388	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1292			1275		1662	1636	1305	1087	1606	1118
Flt Permitted		0.83			0.84		0.50	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)		1108			1091		872	1636	1305	409	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	9	0	39	14	29	4	662	37	41	422	29
RTOR Reduction (vph)	0	0	0	0	25	0	0	0	10	0	0	8
Lane Group Flow (vph)	0	32	0	0	57	0	4	662	27	41	422	21
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.7			8.7		48.1	48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.7			10.7		51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15		0.73	0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		169			167		638	1197	955	299	1175	818
v/s Ratio Prot								c0.40			0.26	
v/s Ratio Perm		0.03			c0.05		0.00		0.02	0.10		0.02
v/c Ratio		0.19			0.34		0.01	0.55	0.03	0.14	0.36	0.03
Uniform Delay, d1		25.8			26.4		2.5	4.2	2.6	2.8	3.4	2.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.2		0.0	1.8	0.1	1.0	0.9	0.1
Delay (s)		26.3			27.7		2.5	6.1	2.6	3.7	4.3	2.6
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.3			27.7			5.9			4.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.1		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			69.8		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			49.8%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

Intersection Capacity Utilization 106.5%	ICU Level of Service G
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

	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 (vph)	15	798	750	267	910	6	678	4	244	0	3	22
Future Volume (vph)	15	798	750	267	910	6	678	4	244	0	3	22
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1583	3197	1430	1614	3164		1582	1375				
Flt Permitted	0.15	1.00	1.00	0.11	1.00		0.74	1.00				
Satd. Flow (perm)	244	3197	1430	184	3164		1232	1375				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	867	815	290	989	7	737	4	265	0	3	24
RTOR Reduction (vph)	0	0	542	0	1	0	0	114	0	0	12	0
Lane Group Flow (vph)	16	867	273	290	995	0	737	155	0	0	15	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8		2				6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1	
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1	
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	90	1070	478	188	1272		590	658			670	
v/s Ratio Prot	0.00	0.27		c0.12	0.31			0.11			0.01	
v/s Ratio Perm	0.05		0.19	c0.50			c0.60					
v/c Ratio	0.18	0.81	0.57	1.54	0.78		1.25	0.24			0.02	
Uniform Delay, d1	28.8	34.3	30.9	27.2	29.4		29.4	17.3			15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.3	6.7	4.9	268.9	4.9		125.8	0.8			0.1	
Delay (s)	30.1	40.9	35.8	296.1	34.3		155.2	18.1			15.5	
Level of Service	C	D	D	F	C		F	B			B	
Approach Delay (s)		38.4			93.3			118.5			15.5	
Approach LOS		D			F			F			B	
Intersection Summary												
HCM 2000 Control Delay		75.9										
HCM 2000 Volume to Capacity ratio		1.35										
Actuated Cycle Length (s)		112.9								12.0		
Intersection Capacity Utilization		106.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
3: Highway 140 & Kleinsmith Road

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	1	0	0	549	700	3
Future Volume (vph)	1	0	0	549	700	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.850	
Flt Protected	0.950					
Satd. Flow (prot)	1662	0	0	1683	1716	1488
Flt Permitted	0.950					
Satd. Flow (perm)	1662	0	0	1683	1716	1488
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			922.6	1215.9	
Travel Time (s)	13.4			66.4	87.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	4%	2%	0%
Adj. Flow (vph)	1	0	0	597	761	3
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1	0	0	597	761	3
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 50.0%	ICU Level of Service A					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
3: Highway 140 & Kleinsmith Road

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement						
Lane Configurations						
Traffic Volume (veh/h)	1	0	0	549	700	3
Future Volume (Veh/h)	1	0	0	549	700	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1	0	0	597	761	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1358	761	764			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1358	761	764			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	100			
cM capacity (veh/h)	166	409	858			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2		
Volume Total	1	597	761	3		
Volume Left	1	0	0	0		
Volume Right	0	0	0	3		
cSH	166	858	1700	1700		
Volume to Capacity	0.01	0.00	0.45	0.00		
Queue Length 95th (m)	0.1	0.0	0.0	0.0		
Control Delay (s)	26.9	0.0	0.0	0.0		
Lane LOS	D					
Approach Delay (s)	26.9	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			50.0%		ICU Level of Service	A
Analysis Period (min)			15			

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

PM - Background (2041)
Nyön Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	
Traffic Volume (vph)	10	0	8	10	4	7	7	567	8	6	585	10	
Future Volume (vph)	10	0	8	10	4	7	7	567	8	6	585	10	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0	
Storage Lanes	0		0	0		0	0		1	0		1	
Taper Length (m)	7.5			7.5			7.5			7.5			
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		0.939			0.953				0.850			0.850	
Flt Protected		0.973			0.977			0.999			0.999		
Satd. Flow (prot)	0	1599	0	0	1629	0	0	1682	1488	0	1695	1488	
Flt Permitted		0.973			0.977			0.999			0.999		
Satd. Flow (perm)	0	1599	0	0	1629	0	0	1682	1488	0	1695	1488	
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		1152.3			139.3			1712.9			922.6		
Travel Time (s)		83.0			10.0			123.3			66.4		
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%	
Adj. Flow (vph)	11	0	9	11	4	8	8	616	9	7	636	11	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	20	0	0	23	0	0	624	9	0	643	11	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			0.0			0.0		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Sign Control		Stop			Stop			Free			Free		
Intersection Summary													
Area Type:	Other												
Control Type:	Unsignalized												
Intersection Capacity Utilization 50.5%	ICU Level of Service A												
Analysis Period (min) 15													

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

PM - Background (2041)
Nyön Marine Fueling Corp Phase 1 TIS

	←	→	↙	↘	←	↙	↘	↑	↗	↖	↓	↘	↖
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔			↔	↔		↔	↔	
Traffic Volume (veh/h)	10	0	8	10	4	7	7	567	8	6	585	10	
Future Volume (Veh/h)	10	0	8	10	4	7	7	567	8	6	585	10	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
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	
Hourly flow rate (vph)	11	0	9	11	4	8	8	616	9	7	636	11	
Pedestrians													
Lane Width (m)													
Walking Speed (m/s)													
Percent Blockage													
Right turn flare (veh)													
Median type								None			None		
Median storage veh													
Upstream signal (m)													
pX, platoon unblocked													
vC, conflicting volume	1292	1291	636	1291	1293	616	647			625			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1292	1291	636	1291	1293	616	647			625			
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3			
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4			
p0 queue free %	92	100	98	92	98	98	99			99			
cM capacity (veh/h)	135	162	481	137	162	494	948			888			
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2							
Volume Total	20	23	624	9	643	11							
Volume Left	11	11	8	0	7	0							
Volume Right	9	8	0	9	0	11							
cSH	199	190	948	1700	888	1700							
Volume to Capacity	0.10	0.12	0.01	0.01	0.01	0.01							
Queue Length 95th (m)	2.6	3.2	0.2	0.0	0.2	0.0							
Control Delay (s)	25.1	26.6	0.2	0.0	0.2	0.0							
Lane LOS	D	D	A		A								
Approach Delay (s)	25.1	26.6	0.2		0.2								
Approach LOS	D	D											
Intersection Summary													
Average Delay			1.0										
Intersection Capacity Utilization			50.5%				ICU Level of Service			A			
Analysis Period (min)			15										

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	4	1	1	3	0	4	4	587	11	7	596	3
Future Volume (vph)	4	1	1	3	0	4	4	587	11	7	596	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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			0.923				0.850			0.850
Flt Protected		0.968			0.979						0.999	
Satd. Flow (prot)	0	1655	0	0	1385	0	0	1683	1271	0	1714	1488
Flt Permitted		0.968			0.979						0.999	
Satd. Flow (perm)	0	1655	0	0	1385	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	4	1	1	3	0	4	4	638	12	8	648	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	7	0	0	642	12	0	656	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	51.1%
Analysis Period (min)	15
ICU Level of Service A	

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	4	1	1	3	0	4	4	587	11	7	596	3
Future Volume (Veh/h)	4	1	1	3	0	4	4	587	11	7	596	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	1	1	3	0	4	4	638	12	8	648	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1314	1322	648	1312	1313	638	651			650		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1314	1322	648	1312	1313	638	651			650		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	100	97	100	99	100			99		
cM capacity (veh/h)	134	156	474	115	158	480	945			946		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	7	642	12	656	3
Volume Left	4	3	4	0	8	0
Volume Right	1	4	0	12	0	3
cSH	156	203	945	1700	946	1700
Volume to Capacity	0.04	0.03	0.00	0.01	0.01	0.00
Queue Length 95th (m)	1.0	0.9	0.1	0.0	0.2	0.0
Control Delay (s)	28.9	23.3	0.1	0.0	0.2	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	28.9	23.3	0.1		0.2	
Approach LOS	D	C				

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)		15	

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2041)
Nycon Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	29	8	6	70	14	21	0	549	59	27	539	32
Future Volume (vph)	29	8	6	70	14	21	0	549	59	27	539	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt		0.980			0.973				0.850			0.850
Flt Protected		0.968			0.968				0.950			
Satd. Flow (prot)	0	1497	0	0	1609	0	1716	1681	1400	1395	1709	1458
Flt Permitted		0.796			0.770				0.390			
Satd. Flow (perm)	0	1230	0	0	1280	0	1716	1681	1400	573	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			16				64			39
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		388.1			2359.9			455.1			2151.0	
Travel Time (s)		27.9			169.9			32.8			154.9	
Confl. Peds. (#/hr)	1					1						
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	32	9	7	76	15	23	0	597	64	29	586	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	0	0	114	0	0	597	64	29	586	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2041)
Nycon Marine Fueling Corp Phase 1 TIS

	↖	→	↗	↙	←	↖	↗	↙	↘	↖	↗	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			2	6	
Detector Phase	4	4		8	8		2	2		2	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0		22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0		52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0		-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max		Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		13.6			13.6			52.0		52.0	52.0	52.0
Actuated g/C Ratio		0.20			0.20			0.75		0.75	0.75	0.75
v/c Ratio		0.20			0.43			0.47		0.06	0.07	0.46
Control Delay		22.6			26.6			6.7		1.5	4.6	6.5
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		22.6			26.6			6.7		1.5	4.6	6.5
LOS		C			C			A		A	A	A
Approach Delay		22.6			26.6			6.2			6.1	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		4.7			11.8			29.4		0.0	1.0	28.3
Queue Length 95th (m)		13.2			26.0			64.9		3.5	4.2	62.4
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)								190.0		55.0		15.0
Base Capacity (vph)		482			507			1258		1064	428	1279
Starvation Cap Reductn		0			0			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.10			0.22			0.47		0.06	0.07	0.46
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		69.5										
Natural Cycle:		55										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.47										
Intersection Signal Delay:		8.3						Intersection LOS: A				
Intersection Capacity Utilization		46.6%						ICU Level of Service A				

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

PM - Background (2041)
Nyon Marine Fueling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	8	6	70	14	21	0	549	59	27	539	32
Future Volume (vph)	29	8	6	70	14	21	0	549	59	27	539	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1496			1608			1681	1400	1395	1709	1458
Flt Permitted		0.80			0.77			1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)		1230			1280			1681	1400	573	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	7	76	15	23	0	597	64	29	586	35
RTOR Reduction (vph)	0	6	0	0	13	0	0	0	18	0	0	10
Lane Group Flow (vph)	0	42	0	0	101	0	0	597	46	29	586	25
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.5			9.5			48.2	48.2	48.2	48.2	48.2
Effective Green, g (s)		11.5			11.5			51.2	51.2	51.2	51.2	51.2
Actuated g/C Ratio		0.16			0.16			0.72	0.72	0.72	0.72	0.72
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		200			208			1217	1013	414	1237	1055
v/s Ratio Prot								c0.36			0.34	
v/s Ratio Perm		0.03			c0.08				0.03	0.05		0.02
v/c Ratio		0.21			0.48			0.49	0.05	0.07	0.47	0.02
Uniform Delay, d1		25.7			26.9			4.2	2.8	2.8	4.1	2.7
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.8			1.4	0.1	0.3	1.3	0.0
Delay (s)		26.2			28.7			5.6	2.9	3.2	5.4	2.8
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.2			28.7			5.3			5.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.7			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		70.7			Sum of lost time (s)			8.0				
Intersection Capacity Utilization		46.6%			ICU Level of Service			A				
Analysis Period (min)		15										

c Critical Lane Group

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:57:39 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - BG 2041						
Leg North	1.33	?	7.45	0.54	A	8.58	A
Leg West	0.29	~1	5.13	0.22	A		
Leg South	2.16	3.24	10.74	0.67	B		
Leg East	0.13	~1	6.38	0.10	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:57:38 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - BG 2041, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2041, AM	BG 2041	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				8.58	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	587.00	100.000
West	ONE HOUR	✓	183.00	100.000
South	ONE HOUR	✓	668.00	100.000
East	ONE HOUR	✓	69.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	139.000	392.000	56.000
	West	137.000	0.000	43.000	3.000
	South	602.000	38.000	0.000	28.000
	East	56.000	0.000	13.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.24	0.67	0.10
	West	0.75	0.00	0.23	0.02
	South	0.90	0.06	0.00	0.04
	East	0.81	0.00	0.19	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.54	7.45	1.33	?	A	538.64	807.96	85.12	6.32	0.95	85.13	6.32
West	0.22	5.13	0.29	~1	A	167.92	251.89	19.56	4.66	0.22	19.56	4.66
South	0.67	10.74	2.16	3.24	B	612.97	919.45	125.43	8.19	1.39	125.45	8.19
East	0.10	6.38	0.13	~1	A	63.32	94.97	8.97	5.66	0.10	8.97	5.67

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	441.92	110.48	439.33	594.75	38.15	0.00	1199.62	1143.77	0.368	0.00	0.65	5.302	A
West	137.77	34.44	137.13	132.45	345.03	0.00	1022.01	666.97	0.135	0.00	0.16	4.209	A
South	502.91	125.73	499.52	335.34	146.82	0.00	1136.73	863.24	0.442	0.00	0.85	6.069	A
East	51.95	12.99	51.66	65.10	581.24	0.00	885.30	454.05	0.059	0.00	0.07	4.981	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	527.70	131.93	526.79	713.10	45.74	0.00	1195.23	1143.77	0.442	0.65	0.88	6.041	A
West	164.51	41.13	164.33	158.82	413.71	0.00	982.26	666.97	0.167	0.16	0.21	4.555	A

South	600.52	150.13	598.99	402.07	175.97	0.00	1119.86	863.24	0.536	0.85	1.23	7.439	A
East	62.03	15.51	61.94	78.06	696.91	0.00	818.36	454.05	0.076	0.07	0.09	5.490	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	646.30	161.57	644.55	871.72	55.92	0.00	1189.34	1143.77	0.543	0.88	1.31	7.400	A
West	201.49	50.37	201.18	194.26	506.21	0.00	928.73	666.97	0.217	0.21	0.28	5.120	A
South	735.48	183.87	731.90	491.99	215.40	0.00	1097.04	863.23	0.670	1.23	2.12	10.539	B
East	75.97	18.99	75.81	95.47	851.83	0.00	728.70	454.05	0.104	0.09	0.13	6.359	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	646.30	161.57	646.25	875.18	56.14	0.00	1189.21	1143.77	0.543	1.31	1.33	7.448	A
West	201.49	50.37	201.48	194.86	507.54	0.00	927.96	666.97	0.217	0.28	0.29	5.130	A
South	735.48	183.87	735.34	493.22	215.79	0.00	1096.81	863.23	0.671	2.12	2.16	10.741	B
East	75.97	18.99	75.97	95.78	855.35	0.00	726.66	454.05	0.105	0.13	0.13	6.382	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	527.70	131.93	529.41	718.24	46.08	0.00	1195.03	1143.77	0.442	1.33	0.90	6.093	A
West	164.51	41.13	164.82	159.73	415.76	0.00	981.07	666.97	0.168	0.29	0.21	4.569	A
South	600.52	150.13	604.07	403.98	176.60	0.00	1119.49	863.24	0.536	2.16	1.27	7.593	A
East	62.03	15.51	62.18	78.53	702.14	0.00	815.33	454.05	0.076	0.13	0.10	5.515	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	441.92	110.48	442.87	600.19	38.50	0.00	1199.42	1143.77	0.368	0.90	0.66	5.354	A
West	137.77	34.44	137.96	133.57	347.81	0.00	1020.40	666.97	0.135	0.21	0.16	4.224	A
South	502.91	125.73	504.52	337.97	147.79	0.00	1136.16	863.24	0.443	1.27	0.87	6.170	A
East	51.95	12.99	52.04	65.66	586.65	0.00	882.17	454.05	0.059	0.10	0.07	5.003	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.41	0.63	5.302	A	A
West	2.35	0.16	4.209	A	A
South	12.19	0.81	6.069	A	A
East	1.05	0.07	4.981	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.82	0.85	6.041	A	A
West	3.05	0.20	4.555	A	A
South	17.75	1.18	7.439	A	A
East	1.39	0.09	5.490	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	18.98	1.27	7.400	A	A
West	4.19	0.28	5.120	A	A
South	29.93	2.00	10.539	B	B

East	1.96	0.13	6.359	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.82	1.32	7.448	A	A
West	4.28	0.29	5.130	A	A
South	32.18	2.15	10.741	B	B
East	2.01	0.13	6.382	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.92	0.93	6.093	A	A
West	3.21	0.21	4.569	A	A
South	19.95	1.33	7.593	A	A
East	1.46	0.10	5.515	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.17	0.68	5.354	A	A
West	2.48	0.17	4.224	A	A
South	13.44	0.90	6.170	A	A
East	1.11	0.07	5.003	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.65	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.88	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.23	0.00	0.00	1.08	2.16			N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.31	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.28	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.12	0.00	0.00	0.00	3.24			N/A	N/A

East	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.33	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.29	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.16	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.90	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.27	0.00	0.00	2.16	2.16			N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.66	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.87	0.00	0.00	1.08	2.16			N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:57:57 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - BG 2041						
Leg North	3.18	8.24	13.04	0.76	B	10.00	A
Leg West	0.30	~1	6.14	0.23	A		
Leg South	1.20	?	7.20	0.54	A		
Leg East	0.12	~1	5.60	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:57:56 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - BG 2041, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
BG 2041, PM	BG 2041	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				10.00	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	816.00	100.000
West	ONE HOUR	✓	163.00	100.000
South	ONE HOUR	✓	551.00	100.000
East	ONE HOUR	✓	71.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	148.000	627.000	41.000
	West	95.000	0.000	64.000	4.000
	South	451.000	52.000	0.000	48.000
	East	60.000	0.000	11.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.18	0.77	0.05
	West	0.58	0.00	0.39	0.02
	South	0.82	0.09	0.00	0.09
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.76	13.04	3.18	8.24	B	748.78	1123.16	172.58	9.22	1.92	172.61	9.22
West	0.23	6.14	0.30	~1	A	149.57	224.36	20.08	5.37	0.22	20.08	5.37
South	0.54	7.20	1.20	?	A	505.61	758.41	76.75	6.07	0.85	76.75	6.07
East	0.09	5.60	0.12	~1	A	65.15	97.73	8.36	5.14	0.09	8.36	5.14

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	614.33	153.58	610.03	453.73	47.17	0.00	1194.40	1124.67	0.514	0.00	1.08	6.301	A
West	122.71	30.68	122.08	149.57	507.62	0.00	927.91	644.38	0.132	0.00	0.16	4.645	A
South	414.82	103.71	412.50	524.91	104.80	0.00	1161.05	962.48	0.357	0.00	0.58	5.046	A
East	53.45	13.36	53.18	69.58	447.72	0.00	962.58	495.82	0.056	0.00	0.07	4.694	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	733.57	183.39	731.38	543.91	56.54	0.00	1188.97	1124.67	0.617	1.08	1.62	8.063	A
West	146.53	36.63	146.33	179.32	608.60	0.00	869.47	644.38	0.169	0.16	0.21	5.174	A

South	495.34	123.83	494.50	629.31	125.62	0.00	1149.00	962.48	0.431	0.58	0.79	5.781	A
East	63.83	15.96	63.75	83.42	536.71	0.00	911.08	495.82	0.070	0.07	0.09	5.038	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	898.43	224.61	892.55	665.57	69.19	0.00	1181.66	1124.67	0.760	1.62	3.09	12.569	B
West	179.47	44.87	179.10	218.98	742.76	0.00	791.82	644.39	0.227	0.21	0.30	6.104	A
South	606.66	151.67	605.04	768.23	153.62	0.00	1132.79	962.48	0.536	0.79	1.19	7.157	A
East	78.17	19.54	78.05	101.95	656.72	0.00	841.62	495.82	0.093	0.09	0.12	5.592	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	898.43	224.61	898.10	667.18	69.36	0.00	1181.56	1124.67	0.760	3.09	3.18	13.039	B
West	179.47	44.87	179.46	220.14	747.32	0.00	789.18	644.39	0.227	0.30	0.30	6.137	A
South	606.66	151.67	606.62	772.66	154.12	0.00	1132.50	962.48	0.536	1.19	1.20	7.203	A
East	78.17	19.54	78.17	102.37	658.37	0.00	840.66	495.82	0.093	0.12	0.12	5.599	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	733.57	183.39	739.48	546.40	56.80	0.00	1188.82	1124.67	0.617	3.18	1.70	8.356	A
West	146.53	36.63	146.90	181.02	615.27	0.00	865.61	644.38	0.169	0.30	0.21	5.211	A
South	495.34	123.83	496.93	635.79	126.38	0.00	1148.56	962.48	0.431	1.20	0.81	5.826	A
East	63.83	15.96	63.95	84.05	539.25	0.00	909.60	495.82	0.070	0.12	0.09	5.051	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	614.33	153.58	616.69	457.13	47.52	0.00	1194.20	1124.67	0.514	1.70	1.11	6.448	A
West	122.71	30.68	122.93	151.08	513.13	0.00	924.72	644.38	0.133	0.21	0.16	4.670	A
South	414.82	103.71	415.69	530.41	105.65	0.00	1160.56	962.48	0.357	0.81	0.59	5.091	A
East	53.45	13.36	53.53	70.21	451.12	0.00	960.61	495.82	0.056	0.09	0.07	4.707	A

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.41	1.03	6.301	A	A
West	2.31	0.15	4.645	A	A
South	8.42	0.56	5.046	A	A
East	1.02	0.07	4.694	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.28	1.55	8.063	A	A
West	3.08	0.21	5.174	A	A
South	11.53	0.77	5.781	A	A
East	1.31	0.09	5.038	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	42.61	2.84	12.569	B	B
West	4.43	0.30	6.104	A	A
South	17.25	1.15	7.157	A	A

East	1.78	0.12	5.592	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	47.14	3.14	13.039	B	B
West	4.55	0.30	6.137	A	A
South	18.00	1.20	7.203	A	A
East	1.81	0.12	5.599	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	26.91	1.79	8.356	A	A
West	3.27	0.22	5.211	A	A
South	12.48	0.83	5.826	A	A
East	1.38	0.09	5.051	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.23	1.15	6.448	A	A
West	2.44	0.16	4.670	A	A
South	9.07	0.60	5.091	A	A
East	1.07	0.07	4.707	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.08	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.58	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.62	0.00	0.00	3.09	4.12			N/A	N/A
West	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.09	0.00	0.00	1.03	8.24			N/A	N/A
West	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.19	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	3.18	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.30	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.20	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.70	0.00	0.00	3.09	5.15			N/A	N/A
West	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.81	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.11	0.00	0.00	2.06	3.09			N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Total (2026)

Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	4	520	495	146	465	2	558	3	188	2	4	10
Future Volume (vph)	4	520	495	146	465	2	558	3	188	2	4	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.890	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1390	0
Flt Permitted	0.465			0.172			0.748			0.603		
Satd. Flow (perm)	814	3167	1340	264	3105	0	1234	1395	0	1055	1390	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			538					204			11	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	4	565	538	159	505	2	607	3	204	2	4	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	565	538	159	507	0	607	207	0	2	15	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Synchro 11 Report
Page 1

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Total (2026)

Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.02	0.78	0.75	0.80	0.48		0.86	0.23		0.00	0.02	
Control Delay	24.2	49.0	10.5	56.8	32.1		34.2	2.3		10.5	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.2	49.0	10.5	56.8	32.1		34.2	2.3		10.5	6.1	
LOS	C	D	B	E	C		C	A		B	A	
Approach Delay		30.2			38.0			26.1			6.6	
Approach LOS		C			D			C			A	
Queue Length 50th (m)	0.6	65.0	0.0	26.6	47.4		111.6	0.3		0.2	0.4	
Queue Length 95th (m)	3.2	86.1	36.5	#54.2	72.2		#192.4	10.4		1.3	3.4	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	261	729	722	199	1050		709	888		606	803	
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	0.02	0.78	0.75	0.80	0.48		0.86	0.23		0.00	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.86

Intersection Signal Delay: 30.8

Intersection LOS: C

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Synchro 11 Report
Page 2

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

Intersection Capacity Utilization 82.1%

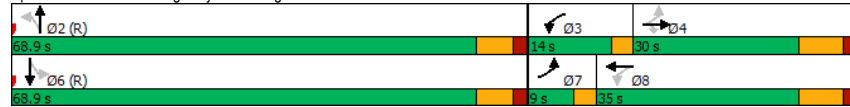
ICU Level of Service E

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis

1: Highway 140 & Regional Road 27

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	4	520	495	146	465	2	558	3	188	2	4	10
Future Volume (vph)	4	520	495	146	465	2	558	3	188	2	4	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1390	
Flt Permitted	0.47	1.00	1.00	0.17	1.00		0.75	1.00		0.60	1.00	
Satd. Flow (perm)	815	3167	1340	265	3106		1233	1395		1054	1390	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	565	538	159	505	2	607	3	204	2	4	11
RTOR Reduction (vph)	0	0	403	0	0	0	0	91	0	0	5	0
Lane Group Flow (vph)	4	565	135	159	507	0	607	116	0	2	10	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	172	796	337	193	1050		682	772		583	769	
v/s Ratio Prot	0.00	0.18		c0.07	0.16			0.08			0.01	
v/s Ratio Perm	0.00		0.10	c0.20			c0.49			0.00		
v/c Ratio	0.02	0.71	0.40	0.82	0.48		0.89	0.15		0.00	0.01	
Uniform Delay, d1	35.3	38.5	35.2	29.9	29.5		22.2	12.3		11.3	11.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	5.3	3.5	24.8	1.6		16.1	0.4		0.0	0.0	
Delay (s)	35.4	43.8	38.7	54.7	31.1		38.3	12.7		11.3	11.4	
Level of Service	D	D	D	D	C		D	B		B	B	
Approach Delay (s)		41.3			36.8			31.8			11.4	
Approach LOS		D			D			C			B	

Intersection Summary

HCM 2000 Control Delay	37.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	112.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	5	1	1	2	0	7	3	561	3	1	344	3
Future Volume (vph)	5	1	1	2	0	7	3	561	3	1	344	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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	0.981				0.892				0.850			0.850
Flt Protected	0.966				0.990							
Satd. Flow (prot)	0	1342	0	0	1545	0	0	1606	1488	0	1563	1488
Flt Permitted	0.966				0.990							
Satd. Flow (perm)	0	1342	0	0	1545	0	0	1606	1488	0	1563	1488
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	1152.3				139.3			1712.9			1318.9	
Travel Time (s)	83.0				10.0			123.3			95.0	
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	5	1	1	2	0	8	3	610	3	1	374	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	7	0	0	10	0	0	613	3	0	375	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0			0.0			0.0	
Link Offset(m)	0.0				0.0			0.0			0.0	
Crosswalk Width(m)	4.8				4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop				Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 48.9%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	5	1	1	2	0	7	3	561	3	1	344	3
Future Volume (Veh/h)	5	1	1	2	0	7	3	561	3	1	344	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	5	1	1	2	0	8	3	610	3	1	374	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1000	995	374	994	995	610	377			613		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1000	995	374	994	995	610	377			613		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	97	100	100	99	100	98	100			100		
cM capacity (veh/h)	191	246	677	224	246	498	1193			976		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	10	613	3	375	3
Volume Left	5	2	3	0	1	0
Volume Right	1	8	0	3	0	3
cSH	221	400	1193	1700	976	1700
Volume to Capacity	0.03	0.02	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.8	0.6	0.1	0.0	0.0	0.0
Control Delay (s)	21.8	14.2	0.1	0.0	0.0	0.0
Lane LOS	C	B	A		A	
Approach Delay (s)	21.8	14.2	0.1	0.0		
Approach LOS	C	B				

Intersection Summary

Average Delay 0.3

Intersection Capacity Utilization 48.9%

ICU Level of Service

A

Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	4	8	0	2	2	556	2	1	347	0
Future Volume (vph)	1	0	4	8	0	2	2	556	2	1	347	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.892			0.975				0.850			
Flt Protected		0.990			0.961							
Satd. Flow (prot)	0	1545	0	0	1591	0	0	1606	1118	0	1559	1750
Flt Permitted		0.990			0.961							
Satd. Flow (perm)	0	1545	0	0	1591	0	0	1606	1118	0	1559	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	4	9	0	2	2	604	2	1	377	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	11	0	0	606	2	0	378	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	43.5%
Analysis Period (min)	15
ICU Level of Service A	

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	4	8	0	2	2	556	2	1	347	0
Future Volume (Veh/h)	1	0	4	8	0	2	2	556	2	1	347	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	4	9	0	2	2	604	2	1	377	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	989	989	377	991	987	604	377			606		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	989	989	377	991	987	604	377			606		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	100	100	99	96	100	100	100			100		
cM capacity (veh/h)	226	248	674	225	249	472	1193			632		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	5	11	606	2	378	0						
Volume Left	1	9	2	0	1	0						
Volume Right	4	2	0	2	0	0						
cSH	483	249	1193	1700	632	1700						
Volume to Capacity	0.01	0.04	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	0.3	1.1	0.0	0.0	0.0	0.0						
Control Delay (s)	12.5	20.1	0.0	0.0	0.1	0.0						
Lane LOS	B	C	A		A							
Approach Delay (s)	12.5	20.1	0.0		0.1							
Approach LOS	B	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			43.5%	ICU Level of Service					A			
Analysis Period (min)			15									

Lanes, Volumes, Timings

6: Highway 140 & Concession 2 Road

AM - Total (2026)

Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	16	6	0	27	9	20	3	522	25	28	315	20	
Future Volume (vph)	16	6	0	27	9	20	3	522	25	28	315	20	
Ideal Flow (vphpl)	1750	1750		1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			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					0.951				0.850			0.850	
Flt Protected		0.966			0.977		0.950			0.950			
Satd. Flow (prot)	0	1294	0	0	1270	0	1662	1636	1305	1087	1606	1118	
Flt Permitted		0.835			0.837		0.555			0.422			
Satd. Flow (perm)	0	1118	0	0	1088	0	971	1636	1305	483	1606	1118	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)					22				39			39	
Link Speed (k/h)		50			50			50			50		
Link Distance (m)		388.1			2359.9			455.1			2151.0		
Travel Time (s)		27.9			169.9			32.8			154.9		
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Adj. Flow (vph)	17	7	0	29	10	22	3	567	27	30	342	22	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	24	0	0	61	0	3	567	27	30	342	22	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)		0.0			0.0			3.6			3.6		
Link Offset(m)		0.0			0.0			0.0			0.0		
Crosswalk Width(m)		4.8			4.8			4.8			4.8		
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		

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Lanes, Volumes, Timings

6: Highway 140 & Concession 2 Road

AM - Total (2026)

Nyon Marine Fuelling Corp Phase 1 TIS

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)							11.0	11.0					
Flash Dont Walk (s)							7.0	7.0					
Pedestrian Calls (#/hr)							0	0					
Act Effect Green (s)		12.3			12.3		55.7	55.7	55.7	55.7	55.7	55.7	
Actuated g/C Ratio		0.18			0.18		0.82	0.82	0.82	0.82	0.82	0.82	
v/c Ratio		0.12			0.28		0.00	0.42	0.03	0.08	0.26	0.02	
Control Delay		25.0			21.1		3.3	4.8	1.0	3.8	3.7	0.8	
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		25.0			21.1		3.3	4.8	1.0	3.8	3.7	0.8	
LOS		C			C		A	A	A	A	A	A	
Approach Delay		25.0			21.1			4.6			3.5		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		2.7			4.5		0.1	27.2	0.0	1.0	13.6	0.0	
Queue Length 95th (m)		8.8			14.4		0.8	49.8	1.4	3.6	25.7	1.1	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)		444			446		796	1342	1077	396	1317	924	
Starvation Cap Reductn		0			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.05			0.14		0.00	0.42	0.03	0.08	0.26	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 83

Actuated Cycle Length: 67.9

Natural Cycle: 55

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 5.6

Intersection LOS: A

Intersection Capacity Utilization 44.8%

ICU Level of Service A

Analysis Period (min) 15

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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 6: Highway 140 & Concession 2 Road

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	16	6	0	27	9	20	3	522	25	28	315	20
Future Volume (vph)	16	6	0	27	9	20	3	522	25	28	315	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1293			1270		1662	1636	1305	1087	1606	1118
Flt Permitted		0.83			0.84		0.56	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		1118			1088		972	1636	1305	483	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	7	0	29	10	22	3	567	27	30	342	22
RTOR Reduction (vph)	0	0	0	0	19	0	0	0	6	0	0	5
Lane Group Flow (vph)	0	24	0	0	42	0	3	567	21	30	342	17
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.3			6.3		51.1	51.1	51.1	51.1	51.1	51.1
Effective Green, g (s)		8.3			8.3		54.1	54.1	54.1	54.1	54.1	54.1
Actuated g/C Ratio		0.12			0.12		0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		131			128		746	1257	1002	371	1234	859
v/s Ratio Prot								0.35			0.21	
v/s Ratio Perm		0.02			0.04		0.00		0.02	0.06		0.02
v/c Ratio		0.18			0.32		0.00	0.45	0.02	0.08	0.28	0.02
Uniform Delay, d1		28.0			28.5		1.9	2.9	1.9	2.0	2.4	1.9
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.7			1.5		0.0	1.2	0.0	0.4	0.6	0.0
Delay (s)		28.7			30.0		1.9	4.1	2.0	2.4	3.0	2.0
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		28.7			30.0			4.0			2.9	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay					5.6							A
HCM 2000 Volume to Capacity ratio					0.43							
Actuated Cycle Length (s)					70.4					8.0		
Intersection Capacity Utilization					44.8%							A
Analysis Period (min)					15							
c Critical Lane Group												

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	27	28	70	496	331	54
Future Volume (vph)	27	28	70	496	331	54
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.931				0.981	
Flt Protected	0.976			0.994		
Satd. Flow (prot)	1272	0	0	1580	1508	0
Flt Permitted	0.976			0.994		
Satd. Flow (perm)	1272	0	0	1580	1508	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	29	30	76	539	360	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	59	0	0	615	419	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 68.5%	ICU Level of Service C
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

AM - Total (2026)
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	27	28	70	496	331	54
Future Volume (Veh/h)	27	28	70	496	331	54
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	30	76	539	360	59
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1080	390	419			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1080	390	419			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	86	95	93			
cM capacity (veh/h)	202	611	1027			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	59	615	419			
Volume Left	29	76	0			
Volume Right	30	0	59			
cSH	306	1027	1700			
Volume to Capacity	0.19	0.07	0.25			
Queue Length 95th (m)	5.6	1.9	0.0			
Control Delay (s)	19.5	1.9	0.0			
Lane LOS	C	A				
Approach Delay (s)	19.5	1.9	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay		2.1				
Intersection Capacity Utilization		68.5%		ICU Level of Service	C	
Analysis Period (min)		15				

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2026 PM.syn

11-08-2024

	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖
Traffic Volume (vph)	11	593	584	202	676	4	555	3	184	0	2	17
Future Volume (vph)	11	593	584	202	676	4	555	3	184	0	2	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.865	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1375	0	1750	1396	0
Flt Permitted	0.312			0.219			0.744					
Satd. Flow (perm)	520	3197	1430	372	3164	0	1239	1375	0	1750	1396	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			635		1		200			18		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		1123.3			1937.5		3375.6			350.8		
Travel Time (s)		80.9			139.5		243.0			25.3		
Confl. Peds. (#/hr)						1		3	3			1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	12	645	635	220	735	4	603	3	200	0	2	18
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	645	635	220	739	0	603	203	0	0	20	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2026)
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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	←	→	↙	↘	↖	↗	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2				6	
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9	
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	41.0	36.0	36.0	49.0	47.2		55.9	55.9			55.9	
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.42		0.50	0.50			0.50	
v/c Ratio	0.05	0.63	0.72	0.85	0.56		0.98	0.26			0.03	
Control Delay	19.1	36.2	7.5	52.1	27.5		61.9	3.2			6.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	19.1	36.2	7.5	52.1	27.5		61.9	3.2			6.8	
LOS	B	D	A	D	C		E	A			A	
Approach Delay		21.9			33.2			47.1			6.8	
Approach LOS		C			C			D			A	
Queue Length 50th (m)	1.6	67.0	0.0	32.8	65.2		133.3	0.4			0.3	
Queue Length 95th (m)	5.3	87.4	32.5	#69.3	97.3		#213.7	12.5			4.4	
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0					
Base Capacity (vph)	235	1019	888	260	1323		613	781			700	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.05	0.63	0.72	0.85	0.56		0.98	0.26			0.03	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 31.9

Intersection LOS: C

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2026)
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Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

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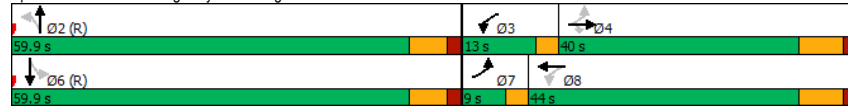
Intersection Capacity Utilization 91.4% ICU Level of Service F

Analysis Period (min) 15

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

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	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 (vph)	11	593	584	202	676	4	555	3	184	0	2	17
Future Volume (vph)	11	593	584	202	676	4	555	3	184	0	2	17
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1375				1396
Flt Permitted	0.31	1.00	1.00	0.22	1.00		0.74	1.00				1.00
Satd. Flow (perm)	520	3197	1430	372	3165		1239	1375				1396
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	12	645	635	220	735	4	603	3	200	0	2	18
RTOR Reduction (vph)	0	0	419	0	1	0	0	105	0	0	9	0
Lane Group Flow (vph)	12	645	216	220	738	0	603	98	0	0	11	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	35.7	34.5	34.5	47.5	43.3		50.5	50.5			50.5	
Effective Green, g (s)	33.7	38.4	38.4	46.5	47.2		53.5	53.5			53.5	
Actuated g/C Ratio	0.30	0.34	0.34	0.41	0.42		0.47	0.47			0.47	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	157	1087	486	252	1323		587	651			661	
v/s Ratio Prot	0.00	0.20		c0.07	0.23			0.07			0.01	
v/s Ratio Perm	0.02		0.15	c0.29			c0.49					
v/c Ratio	0.08	0.59	0.44	0.87	0.56		1.03	0.15			0.02	
Uniform Delay, d1	30.8	30.8	29.0	26.8	24.9		29.7	16.8			15.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.3	2.4	2.9	27.2	1.7		44.3	0.5			0.0	
Delay (s)	31.1	33.2	31.9	54.0	26.6		74.0	17.3			15.8	
Level of Service	C	C	C	D	C		E	B			B	
Approach Delay (s)		32.5			32.9			59.7			15.8	
Approach LOS		C			C			E			B	
Intersection Summary												
HCM 2000 Control Delay		39.7										
HCM 2000 Volume to Capacity ratio		0.94										
Actuated Cycle Length (s)		112.9			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		91.4%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2026 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	7	0	6	7	3	5	5	462	6	4	523	7
Future Volume (vph)	7	0	6	7	3	5	5	462	6	4	523	7
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.937			0.958				0.850			0.850
Flt Protected		0.974			0.976							
Satd. Flow (prot)	0	1597	0	0	1636	0	0	1683	1488	0	1697	1488
Flt Permitted		0.974			0.976							
Satd. Flow (perm)	0	1597	0	0	1636	0	0	1683	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			1313.7	
Travel Time (s)		83.0			10.0			123.3			94.6	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	8	0	7	8	3	5	5	502	7	4	568	8
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	15	0	0	16	0	0	507	7	0	572	8
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 46.8%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2026 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	7	0	6	7	3	5	5	462	6	4	523	7
Future Volume (Veh/h)	7	0	6	7	3	5	5	462	6	4	523	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	0	7	8	3	5	5	502	7	4	568	8
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1094	1095	568	1095	1096	502	576			509		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1094	1095	568	1095	1096	502	576			509		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	96	100	99	96	99	99	100			100		
cM capacity (veh/h)	188	214	526	189	213	573	1007			983		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	15	16	507	7	572	8
Volume Left	8	8	5	0	4	0
Volume Right	7	5	0	7	0	8
cSH	268	246	1007	1700	983	1700
Volume to Capacity	0.06	0.07	0.00	0.00	0.00	0.00
Queue Length 95th (m)	1.4	1.7	0.1	0.0	0.1	0.0
Control Delay (s)	19.2	20.7	0.1	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	19.2	20.7	0.1		0.1	
Approach LOS	C	C				

Intersection Summary

Average Delay 0.7

Intersection Capacity Utilization 46.8%

ICU Level of Service

A

Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2026 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	3	1	1	2	0	3	3	477	8	5	531	2
Future Volume (vph)	3	1	1	2	0	3	3	477	8	5	531	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.973			0.919				0.850			0.850
Flt Protected		0.971			0.980							
Satd. Flow (prot)	0	1653	0	0	1392	0	0	1683	1271	0	1716	1488
Flt Permitted		0.971			0.980							
Satd. Flow (perm)	0	1653	0	0	1392	0	0	1683	1271	0	1716	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	3	1	1	2	0	3	3	518	9	5	577	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	5	0	0	521	9	0	582	2
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2026 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	3	1	1	2	0	3	3	477	8	5	531	2
Future Volume (Veh/h)	3	1	1	2	0	3	3	477	8	5	531	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	1	1	2	0	3	3	518	9	5	577	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1114	1120	577	1112	1113	518	579			527		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1114	1120	577	1112	1113	518	579			527		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	98	100	100	99	100	99	100			100		
cM capacity (veh/h)	185	207	520	160	209	562	1005			1050		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	521	9	582	2
Volume Left	3	2	3	0	5	0
Volume Right	1	3	0	9	0	2
cSH	218	281	1005	1700	1050	1700
Volume to Capacity	0.02	0.02	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.6	0.4	0.1	0.0	0.1	0.0
Control Delay (s)	21.9	18.1	0.1	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	21.9	18.1	0.1		0.1	
Approach LOS	C	C				

Intersection Summary

Average Delay	0.3
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2026 PM.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	22	6	4	52	10	16	0	449	44	20	488	24
Future Volume (vph)	22	6	4	52	10	16	0	449	44	20	488	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt	0.985				0.973				0.850			0.850
Flt Protected	0.967				0.968				0.950			
Satd. Flow (prot)	0	1503	0	0	1609	0	1716	1681	1400	1395	1709	1458
Flt Permitted	0.824				0.777				0.458			
Satd. Flow (perm)	0	1279	0	0	1291	0	1716	1681	1400	673	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	4				16				48			39
Link Speed (k/h)	50				50				50			50
Link Distance (m)	388.1				2359.9				455.1			2151.0
Travel Time (s)	27.9				169.9				32.8			154.9
Confl. Peds. (#/hr)	1				1							
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	24	7	4	57	11	17	0	488	48	22	530	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	35	0	0	85	0	0	488	48	22	530	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			3.6
Link Offset(m)	0.0				0.0				0.0			0.0
Crosswalk Width(m)	4.8				4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2026)
PTSL (200364)

Synchro 11 Report
Page 9

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2026 PM.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0		-2.0			-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		12.7			12.7			51.9	51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.76	0.76	0.76	0.76	0.76
v/c Ratio		0.15			0.34			0.38	0.04	0.04	0.41	0.02
Control Delay		23.0			24.7			5.2	1.4	3.8	5.4	1.0
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		23.0			24.7			5.2	1.4	3.8	5.4	1.0
LOS		C			C			A	A	A	A	A
Approach Delay		23.0			24.7			4.9			5.1	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		3.5			8.1			21.4	0.0	0.7	24.0	0.0
Queue Length 95th (m)		10.8			20.1			42.2	2.7	2.9	46.8	1.5
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)									190.0	55.0		15.0
Base Capacity (vph)		507			519			1274	1073	510	1295	1114
Starvation Cap Reductn		0			0			0	0	0	0	0
Spillback Cap Reductn		0			0			0	0	0	0	0
Storage Cap Reductn		0			0			0	0	0	0	0
Reduced v/c Ratio		0.07			0.16			0.38	0.04	0.04	0.41	0.02
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		68.5										
Natural Cycle:		50										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.41										
Intersection Signal Delay:		6.9						Intersection LOS:	A			
Intersection Capacity Utilization		43.3%						ICU Level of Service	A			

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2026)
PTSL (200364)

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2026 PM.syn
11-08-2024

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2026 PM.syn
11-08-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	6	4	52	10	16	0	449	44	20	488	24
Future Volume (vph)	22	6	4	52	10	16	0	449	44	20	488	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1501			1608			1681	1400	1395	1709	1458
Flt Permitted		0.82			0.78			1.00	1.00	0.46	1.00	1.00
Satd. Flow (perm)		1279			1292			1681	1400	672	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	7	4	57	11	17	0	488	48	22	530	26
RTOR Reduction (vph)	0	3	0	0	14	0	0	0	13	0	0	7
Lane Group Flow (vph)	0	32	0	0	71	0	0	488	35	22	530	19
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.6			8.6			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.6			10.6			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		194			196			1232	1026	492	1252	1068
v/s Ratio Prot								0.29			0.31	
v/s Ratio Perm		0.02			0.06				0.03	0.03		0.01
v/c Ratio		0.16			0.36			0.40	0.03	0.04	0.42	0.02
Uniform Delay, d1		25.7			26.5			3.5	2.5	2.6	3.6	2.5
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4			1.2			1.0	0.1	0.2	1.1	0.0
Delay (s)		26.1			27.7			4.5	2.6	2.7	4.6	2.5
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.1			27.7			4.3			4.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		6.6			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		69.7			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		43.3%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2026 PM.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	88	41	408	520	30
Future Volume (vph)	56	88	41	408	520	30
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.917				0.993	
Flt Protected	0.981			0.995		
Satd. Flow (prot)	1259	0	0	1644	1683	0
Flt Permitted	0.981			0.995		
Satd. Flow (perm)	1259	0	0	1644	1683	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	61	96	45	443	565	33
Shared Lane Traffic (%)						
Lane Group Flow (vph)	157	0	0	488	598	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 76.2%	ICU Level of Service D
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2026 PM.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	56	88	41	408	520	30
Future Volume (Veh/h)	56	88	41	408	520	30
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	61	96	45	443	565	33
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1114	582	598			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1114	582	598			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	69	80	95			
cM capacity (veh/h)	197	473	876			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	157	488	598
Volume Left	61	45	0
Volume Right	96	0	33
cSH	306	876	1700
Volume to Capacity	0.51	0.05	0.35
Queue Length 95th (m)	22.0	1.3	0.0
Control Delay (s)	28.5	1.4	0.0
Lane LOS	D	A	
Approach Delay (s)	28.5	1.4	0.0
Approach LOS	D		

Intersection Summary

Average Delay	4.2
Intersection Capacity Utilization 76.2%	ICU Level of Service D
Analysis Period (min)	15

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:55:38 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - TT 2026						
Leg North	1.01	1.12	6.81	0.48	A	7.08	A
Leg West	0.21	~1	4.95	0.17	A		
Leg South	1.27	?	8.01	0.54	A		
Leg East	0.09	~1	5.82	0.07	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM " model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:55:38 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - TT 2026, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2026, AM	TT 2026	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				7.08	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	488.00	100.000
West	ONE HOUR	✓	136.00	100.000
South	ONE HOUR	✓	523.00	100.000
East	ONE HOUR	✓	51.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	103.000	343.000	42.000
	West	102.000	0.000	32.000	2.000
	South	474.000	28.000	0.000	21.000
	East	42.000	0.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.21	0.70	0.09
	West	0.75	0.00	0.24	0.01
	South	0.91	0.05	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.48	6.81	1.01	1.12	A	447.80	671.70	66.94	5.98	0.74	66.95	5.98
West	0.17	4.95	0.21	~1	A	124.80	187.19	14.29	4.58	0.16	14.29	4.58
South	0.54	8.01	1.27	?	A	479.91	719.87	80.46	6.71	0.89	80.47	6.71
East	0.07	5.82	0.09	~1	A	46.80	70.20	6.24	5.33	0.07	6.24	5.33

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	367.39	91.85	365.27	462.54	27.69	0.00	1137.80	1084.56	0.323	0.00	0.53	5.216	A
West	102.39	25.60	101.91	98.05	294.91	0.00	983.14	614.99	0.104	0.00	0.12	4.228	A
South	393.74	98.44	391.33	287.45	109.37	0.00	1090.53	827.62	0.361	0.00	0.60	5.538	A
East	38.40	9.60	38.19	48.65	452.04	0.00	892.20	427.12	0.043	0.00	0.05	4.861	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	438.70	109.68	438.02	554.62	33.20	0.00	1134.61	1084.56	0.387	0.53	0.70	5.793	A
West	122.26	30.57	122.13	117.58	353.65	0.00	949.15	614.99	0.129	0.12	0.15	4.507	A

South	470.17	117.54	469.28	344.69	131.09	0.00	1077.96	827.62	0.436	0.60	0.82	6.374	A
East	45.85	11.46	45.79	58.34	542.04	0.00	840.12	427.12	0.055	0.05	0.07	5.227	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	537.30	134.32	536.09	678.63	40.63	0.00	1130.31	1084.56	0.475	0.70	1.00	6.784	A
West	149.74	37.43	149.53	143.89	432.83	0.00	903.32	614.99	0.166	0.15	0.20	4.943	A
South	575.83	143.96	574.10	421.88	160.49	0.00	1060.95	827.62	0.543	0.82	1.26	7.952	A
East	56.15	14.04	56.06	71.39	663.20	0.00	770.00	427.12	0.073	0.07	0.09	5.816	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	537.30	134.32	537.27	680.38	40.73	0.00	1130.25	1084.56	0.475	1.00	1.01	6.812	A
West	149.74	37.43	149.74	144.23	433.78	0.00	902.77	614.99	0.166	0.20	0.21	4.949	A
South	575.83	143.96	575.79	422.77	160.74	0.00	1060.80	827.62	0.543	1.26	1.27	8.009	A
East	56.15	14.04	56.15	71.56	664.97	0.00	768.97	427.12	0.073	0.09	0.09	5.824	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	438.70	109.68	439.88	557.34	33.37	0.00	1134.52	1084.56	0.387	1.01	0.71	5.827	A
West	122.26	30.57	122.47	118.11	355.15	0.00	948.28	614.99	0.129	0.21	0.15	4.516	A
South	470.17	117.54	471.86	346.10	131.51	0.00	1077.72	827.62	0.436	1.27	0.85	6.430	A
East	45.85	11.46	45.94	58.61	544.76	0.00	838.54	427.12	0.055	0.09	0.07	5.239	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	367.39	91.85	368.09	466.24	27.92	0.00	1137.67	1084.56	0.323	0.71	0.54	5.255	A
West	102.39	25.60	102.52	98.82	297.19	0.00	981.83	614.99	0.104	0.15	0.12	4.241	A
South	393.74	98.44	394.66	289.63	110.08	0.00	1090.12	827.62	0.361	0.85	0.62	5.593	A
East	38.40	9.60	38.45	49.03	455.70	0.00	890.09	427.12	0.043	0.07	0.05	4.877	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	7.71	0.51	5.216	A	A
West	1.76	0.12	4.228	A	A
South	8.75	0.58	5.538	A	A
East	0.76	0.05	4.861	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.25	0.68	5.793	A	A
West	2.25	0.15	4.507	A	A
South	12.03	0.80	6.374	A	A
East	0.98	0.07	5.227	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.57	0.97	6.784	A	A
West	3.01	0.20	4.943	A	A
South	18.12	1.21	7.952	A	A

East	1.33	0.09	5.816	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.10	1.01	6.812	A	A
West	3.07	0.20	4.949	A	A
South	18.97	1.26	8.009	A	A
East	1.36	0.09	5.824	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.03	0.74	5.827	A	A
West	2.35	0.16	4.516	A	A
South	13.11	0.87	6.430	A	A
East	1.03	0.07	5.239	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	8.28	0.55	5.255	A	A
West	1.85	0.12	4.241	A	A
South	9.48	0.63	5.593	A	A
East	0.80	0.05	4.877	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.53	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.00	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

South	1.26	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.01	0.00	0.00	0.00	1.12			N/A	N/A
West	0.21	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.27	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.71	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.54	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.62	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:55:55 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - TT 2026						
Leg North	1.66	1.03	8.68	0.62	A	7.47	A
Leg West	0.20	~1	5.50	0.16	A		
Leg South	0.92	1.05	6.55	0.47	A		
Leg East	0.09	~1	5.49	0.07	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM

"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM

"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM

"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM

"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM

"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM

"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM

"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:55:54 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - TT 2026, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2026, PM	TT 2026	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				7.47	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	634.00	100.000
West	ONE HOUR	✓	122.00	100.000
South	ONE HOUR	✓	463.00	100.000
East	ONE HOUR	✓	53.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	110.000	494.000	30.000
	West	71.000	0.000	48.000	3.000
	South	390.000	38.000	0.000	35.000
	East	45.000	0.000	8.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.17	0.78	0.05
	West	0.58	0.00	0.39	0.02
	South	0.84	0.08	0.00	0.08
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.62	8.68	1.66	1.03	A	581.77	872.65	102.30	7.03	1.14	102.32	7.04
West	0.16	5.50	0.20	~1	A	111.95	167.92	13.95	4.99	0.16	13.95	4.99
South	0.47	6.55	0.92	1.05	A	424.86	637.29	60.80	5.72	0.68	60.80	5.72
East	0.07	5.49	0.09	~1	A	48.63	72.95	6.21	5.11	0.07	6.21	5.11

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	477.31	119.33	474.35	378.89	34.44	0.00	1133.89	1070.03	0.421	0.00	0.74	5.595	A
West	91.85	22.96	91.39	110.75	398.04	0.00	923.46	601.57	0.099	0.00	0.11	4.496	A
South	348.57	87.14	346.66	411.55	77.88	0.00	1108.75	913.34	0.314	0.00	0.48	4.957	A
East	39.90	9.98	39.69	50.90	373.64	0.00	937.58	462.56	0.043	0.00	0.05	4.753	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	569.95	142.49	568.78	454.23	41.29	0.00	1129.93	1070.03	0.504	0.74	1.03	6.591	A
West	109.68	27.42	109.54	132.79	477.28	0.00	877.60	601.57	0.125	0.11	0.15	4.873	A

South	416.23	104.06	415.60	493.47	93.36	0.00	1099.80	913.34	0.378	0.48	0.63	5.530	A
East	47.65	11.91	47.59	61.02	447.94	0.00	894.58	462.56	0.053	0.05	0.07	5.040	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	698.05	174.51	695.60	555.96	50.54	0.00	1124.58	1070.03	0.621	1.03	1.64	8.590	A
West	134.32	33.58	134.10	162.43	583.71	0.00	816.00	601.57	0.165	0.15	0.20	5.487	A
South	509.77	127.44	508.65	603.55	114.25	0.00	1087.70	913.34	0.469	0.63	0.92	6.526	A
East	58.35	14.59	58.27	74.66	548.24	0.00	836.53	462.56	0.070	0.07	0.09	5.485	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	698.05	174.51	697.97	557.09	50.64	0.00	1124.52	1070.03	0.621	1.64	1.66	8.684	A
West	134.32	33.58	134.32	162.94	585.68	0.00	814.86	601.57	0.165	0.20	0.20	5.498	A
South	509.77	127.44	509.75	605.50	114.50	0.00	1087.56	913.34	0.469	0.92	0.92	6.553	A
East	58.35	14.59	58.35	74.86	549.38	0.00	835.87	462.56	0.070	0.09	0.09	5.490	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	569.95	142.49	572.36	456.01	41.46	0.00	1129.84	1070.03	0.504	1.66	1.06	6.678	A
West	109.68	27.42	109.89	133.56	480.26	0.00	875.87	601.57	0.125	0.20	0.15	4.888	A
South	416.23	104.06	417.33	496.41	93.74	0.00	1099.58	913.34	0.379	0.92	0.65	5.559	A
East	47.65	11.91	47.73	61.33	449.73	0.00	893.54	462.56	0.053	0.09	0.07	5.049	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	477.31	119.33	478.54	381.61	34.69	0.00	1133.75	1070.03	0.421	1.06	0.76	5.668	A
West	91.85	22.96	91.98	111.69	401.54	0.00	921.43	601.57	0.100	0.15	0.12	4.514	A
South	348.57	87.14	349.21	415.09	78.44	0.00	1108.43	913.34	0.314	0.65	0.49	4.993	A
East	39.90	9.98	39.96	51.30	376.35	0.00	936.01	462.56	0.043	0.07	0.05	4.764	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.70	0.71	5.595	A	A
West	1.67	0.11	4.496	A	A
South	6.96	0.46	4.957	A	A
East	0.77	0.05	4.753	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.01	1.00	6.591	A	A
West	2.18	0.15	4.873	A	A
South	9.30	0.62	5.530	A	A
East	0.98	0.07	5.040	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.51	1.57	8.590	A	A
West	2.99	0.20	5.487	A	A
South	13.32	0.89	6.526	A	A

East	1.30	0.09	5.485	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	24.85	1.66	8.684	A	A
West	3.06	0.20	5.498	A	A
South	13.79	0.92	6.553	A	A
East	1.33	0.09	5.490	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.56	1.10	6.678	A	A
West	2.29	0.15	4.888	A	A
South	9.97	0.66	5.559	A	A
East	1.03	0.07	5.049	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.67	0.78	5.668	A	A
West	1.76	0.12	4.514	A	A
South	7.46	0.50	4.993	A	A
East	0.81	0.05	4.764	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.74	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.48	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.03	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.63	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.64	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

South	0.92	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.66	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.20	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.92	0.00	0.00	0.00	1.05			N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.06	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.65	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.76	0.00	0.00	1.03	1.03			N/A	N/A
West	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.49	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	5	574	572	164	513	2	629	3	210	2	5	11
Future Volume (vph)	5	574	572	164	513	2	629	3	210	2	5	11
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.894	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1402	0
Flt Permitted	0.426			0.145			0.746			0.581		
Satd. Flow (perm)	746	3167	1340	223	3105	0	1230	1395	0	1017	1402	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			622					228			12	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	5	624	622	178	558	2	684	3	228	2	5	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	624	622	178	560	0	684	231	0	2	17	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2031)
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2031 AM.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.02	0.86	0.79	0.95	0.53		0.97	0.26		0.00	0.02	
Control Delay	24.2	54.5	11.4	84.3	33.1		51.2	2.3		10.5	6.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.2	54.5	11.4	84.3	33.1		51.2	2.3		10.5	6.1	
LOS	C	D	B	F	C		D	A		B	A	
Approach Delay		33.0			45.4			38.8			6.5	
Approach LOS		C			D			D			A	
Queue Length 50th (m)	0.8	73.5	0.0	30.2	53.4		144.0	0.3		0.2	0.5	
Queue Length 95th (m)	3.5	#103.3	42.7	#72.0	80.5		#232.7	10.8		1.3	3.7	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	245	729	787	188	1050		707	898		584	811	
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	0.02	0.86	0.79	0.95	0.53		0.97	0.26		0.00	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Intersection Signal Delay: 37.8

Intersection LOS: D

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2031)
PTSL 200364Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2031 AM.syn
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Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27

← Ø2 (R)	Ø3	→ Ø4
68.9 s	14 s	30 s
↓ Ø6 (R)	Ø7	← Ø8
68.9 s	19 s	35 s

HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

TT 2031 AM.syn
11-08-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↗	↙	↘	↗	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖	↖			
Traffic Volume (vph)	5	574	572	164	513	2	629	3	210	2	5	11			
Future Volume (vph)	5	574	572	164	513	2	629	3	210	2	5	11			
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750			
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0				
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00				
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99				
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00				
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89				
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1662	3167	1340	1458	3107		1567	1395		1662	1402				
Flt Permitted	0.43	1.00	1.00	0.15	1.00		0.75	1.00		0.58	1.00				
Satd. Flow (perm)	746	3167	1340	223	3107		1231	1395		1017	1402				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Adj. Flow (vph)	5	624	622	178	558	2	684	3	228	2	5	12			
RTOR Reduction (vph)	0	0	466	0	0	0	0	102	0	0	5	0			
Lane Group Flow (vph)	5	624	156	178	560	0	684	129	0	2	12	0			
Confl. Peds. (#/hr)							1					1			
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%			
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA				
Protected Phases	7	4		3	8			2			6				
Permitted Phases	4		4	8			2				6				
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5				
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5				
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55				
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0				
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0				
Lane Grp Cap (vph)	158	796	337	183	1051		681	772		562	776				
v/s Ratio Prot	0.00	0.20		c0.09	0.18			0.09			0.01				
v/s Ratio Perm	0.01		0.12	c0.24			c0.56			0.00					
v/c Ratio	0.03	0.78	0.46	0.97	0.53		1.00	0.17		0.00	0.02				
Uniform Delay, d1	35.5	39.4	35.8	31.6	30.1		25.2	12.4		11.3	11.3				
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00				
Incremental Delay, d2	0.1	7.6	4.5	58.4	1.9		35.6	0.5		0.0	0.0				
Delay (s)	35.6	47.0	40.3	89.9	32.1		60.8	12.9		11.3	11.4				
Level of Service	D	D	D	F	C		E	B		B	B				
Approach Delay (s)		43.6			46.0			48.7			11.4				
Approach LOS		D			D			D			B				
Intersection Summary															
HCM 2000 Control Delay		45.6					HCM 2000 Level of Service			D					
HCM 2000 Volume to Capacity ratio		0.97													
Actuated Cycle Length (s)		112.9					Sum of lost time (s)			12.0					
Intersection Capacity Utilization		88.3%					ICU Level of Service			E					
Analysis Period (min)		15													
c Critical Lane Group															

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2031 AM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	6	1	1	2	0	8	3	655	3	1	394	3
Future Volume (vph)	6	1	1	2	0	8	3	655	3	1	394	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.985			0.890				0.850			0.850
Flt Protected		0.963			0.991							
Satd. Flow (prot)	0	1321	0	0	1543	0	0	1606	1488	0	1563	1488
Flt Permitted		0.963			0.991							
Satd. Flow (perm)	0	1321	0	0	1543	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			1318.9
Travel Time (s)		83.0			10.0				123.3			95.0
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	7	1	1	2	0	9	3	712	3	1	428	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	11	0	0	715	3	0	429	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 54.3%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2031 AM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	6	1	1	2	0	8	3	655	3	1	394	3
Future Volume (Veh/h)	6	1	1	2	0	8	3	655	3	1	394	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	1	1	2	0	9	3	712	3	1	428	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1157	1151	428	1150	1151	712	431			715		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1157	1151	428	1150	1151	712	431			715		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	100	99	100	98	100			100		
cM capacity (veh/h)	147	199	631	176	199	436	1139			895		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	11	715	3	429	3
Volume Left	7	2	3	0	1	0
Volume Right	1	9	0	3	0	3
cSH	166	343	1139	1700	895	1700
Volume to Capacity	0.05	0.03	0.00	0.00	0.00	0.00
Queue Length 95th (m)	1.4	0.8	0.1	0.0	0.0	0.0
Control Delay (s)	27.9	15.8	0.1	0.0	0.0	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	27.9	15.8	0.1	0.0		
Approach LOS	D	C				

Intersection Summary

Average Delay	0.4
Intersection Capacity Utilization 54.3%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2031 AM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	5	9	0	2	2	649	2	1	398	0
Future Volume (vph)	1	0	5	9	0	2	2	649	2	1	398	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.887			0.977				0.850			
Flt Protected		0.992			0.960							
Satd. Flow (prot)	0	1540	0	0	1596	0	0	1606	1118	0	1560	1750
Flt Permitted		0.992			0.960							
Satd. Flow (perm)	0	1540	0	0	1596	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	5	10	0	2	2	705	2	1	433	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	12	0	0	707	2	0	434	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 48.8%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2031 AM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	5	9	0	2	2	649	2	1	398	0
Future Volume (Veh/h)	1	0	5	9	0	2	2	649	2	1	398	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	5	10	0	2	2	705	2	1	433	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1146	1146	433	1149	1144	705	433			707		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1146	1146	433	1149	1144	705	433			707		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	94	100	100	100			100		
cM capacity (veh/h)	177	200	627	175	201	412	1137			569		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	12	707	2	434	0
Volume Left	1	10	2	0	1	0
Volume Right	5	2	0	2	0	0
cSH	440	194	1137	1700	569	1700
Volume to Capacity	0.01	0.06	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.3	1.6	0.0	0.0	0.0	0.0
Control Delay (s)	13.3	24.8	0.0	0.0	0.1	0.0
Lane LOS	B	C	A		A	
Approach Delay (s)	13.3	24.8	0.0		0.1	
Approach LOS	B	C				

Intersection Summary

Average Delay	0.4
Intersection Capacity Utilization 48.8%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2031 AM.syn
11-08-2024

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	17	7	0	30	10	22	3	612	28	31	362	22	
Future Volume (vph)	17	7	0	30	10	22	3	612	28	31	362	22	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			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					0.952				0.850			0.850	
Flt Protected	0.967				0.976		0.950			0.950			
Satd. Flow (prot)	0	1296	0	0	1272	0	1662	1636	1305	1087	1606	1118	
Flt Permitted	0.828				0.833		0.525			0.369			
Satd. Flow (perm)	0	1110	0	0	1086	0	919	1636	1305	422	1606	1118	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)					24				39			39	
Link Speed (k/h)	50				50				50			50	
Link Distance (m)	388.1				2359.9				455.1			2151.0	
Travel Time (s)	27.9				169.9				32.8			154.9	
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Adj. Flow (vph)	18	8	0	33	11	24	3	665	30	34	393	24	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	26	0	0	68	0	3	665	30	34	393	24	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	0.0				0.0				3.6			3.6	
Link Offset(m)	0.0				0.0				0.0			0.0	
Crosswalk Width(m)	4.8				4.8				4.8			4.8	
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2031)
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

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	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)	11.0	11.0											
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.5			12.5		54.5	54.5	54.5	54.5	54.5	54.5	
Actuated g/C Ratio		0.19			0.19		0.82	0.82	0.82	0.82	0.82	0.82	
v/c Ratio		0.12			0.30		0.00	0.50	0.03	0.10	0.30	0.03	
Control Delay	24.9	21.3			21.3		3.3	5.7	1.1	4.2	4.0	0.9	
Queue Delay	0.0				0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	24.9	21.3			21.3		3.3	5.7	1.1	4.2	4.0	0.9	
LOS	C			C			A	A	A	A	A	A	
Approach Delay	24.9			21.3			5.5				3.8		
Approach LOS	C			C			A				A		
Queue Length 50th (m)	3.0			5.1			0.1	35.0	0.0	1.2	16.2	0.0	
Queue Length 95th (m)	9.2			15.7			0.8	67.9	1.7	4.3	31.5	1.3	
Internal Link Dist (m)	364.1			2335.9			431.1				2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)	452			456			752	1339	1075	345	1315	922	
Starvation Cap Reductn	0			0			0	0	0	0	0	0	
Spillback Cap Reductn	0			0			0	0	0	0	0	0	
Storage Cap Reductn	0			0			0	0	0	0	0	0	
Reduced v/c Ratio	0.06			0.15			0.00	0.50	0.03	0.10	0.30	0.03	

Intersection Summary

Area Type: Other

Cycle Length: 83

Actuated Cycle Length: 66.5

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 6.2

Intersection LOS: A

Intersection Capacity Utilization 50.0%

ICU Level of Service A

Analysis Period (min) 15

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2031)
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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2031 AM.syn
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Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	31 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2031 AM.syn
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	17	7	0	30	10	22	3	612	28	31	362	22	
Future Volume (vph)	17	7	0	30	10	22	3	612	28	31	362	22	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)		1296			1273		1662	1636	1305	1087	1606	1118	
Flt Permitted		0.83			0.83		0.52	1.00	1.00	0.37	1.00	1.00	
Satd. Flow (perm)		1111			1086		918	1636	1305	422	1606	1118	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	18	8	0	33	11	24	3	665	30	34	393	24	
RTOR Reduction (vph)	0	0	0	0	21	0	0	0	7	0	0	6	
Lane Group Flow (vph)	0	26	0	0	47	0	3	665	23	34	393	18	
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		
Permitted Phases	4			8			2			6		6	
Actuated Green, G (s)		6.2			6.2		49.7	49.7	49.7	49.7	49.7	49.7	
Effective Green, g (s)		8.2			8.2		52.7	52.7	52.7	52.7	52.7	52.7	
Actuated g/C Ratio		0.12			0.12		0.76	0.76	0.76	0.76	0.76	0.76	
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)		132			129		702	1251	998	322	1228	855	
v/s Ratio Prot								c0.41			0.24		
v/s Ratio Perm		0.02			c0.04		0.00		0.02	0.08		0.02	
v/c Ratio		0.20			0.36		0.00	0.53	0.02	0.11	0.32	0.02	
Uniform Delay, d1		27.4			27.9		1.9	3.2	1.9	2.1	2.5	1.9	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.7			1.7		0.0	1.6	0.0	0.7	0.7	0.0	
Delay (s)		28.1			29.7		1.9	4.8	2.0	2.7	3.2	2.0	
Level of Service		C			C		A	A	A	A	A	A	
Approach Delay (s)		28.1			29.7			4.7			3.1		
Approach LOS		C			C			A			A		
Intersection Summary													
HCM 2000 Control Delay		6.0											
HCM 2000 Volume to Capacity ratio		0.51											
Actuated Cycle Length (s)		68.9							8.0				
Intersection Capacity Utilization		50.0%											
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2031 AM.syn
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	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	43	45	113	548	365	88
Future Volume (vph)	43	45	113	548	365	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.931				0.974	
Flt Protected	0.976			0.992		
Satd. Flow (prot)	1272	0	0	1565	1488	0
Flt Permitted	0.976			0.992		
Satd. Flow (perm)	1272	0	0	1565	1488	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	47	49	123	596	397	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	0	0	719	493	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization 80.3%	ICU Level of Service D					
Analysis Period (min) 15						

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2031 AM.syn
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	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	43	45	113	548	365	88
Future Volume (Veh/h)	43	45	113	548	365	88
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	49	123	596	397	96
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1287	445	493			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1287	445	493			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	67	91	87			
cM capacity (veh/h)	142	568	962			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	96	719	493			
Volume Left	47	123	0			
Volume Right	49	0	96			
cSH	229	962	1700			
Volume to Capacity	0.42	0.13	0.29			
Queue Length 95th (m)	15.5	3.5	0.0			
Control Delay (s)	31.5	3.1	0.0			
Lane LOS	D	A				
Approach Delay (s)	31.5	3.1	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			80.3%		ICU Level of Service	D
Analysis Period (min)			15			

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	13	654	658	223	746	5	636	3	205	0	2	18
Future Volume (vph)	13	654	658	223	746	5	636	3	205	0	2	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.864	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1374	0	1750	1393	0
Flt Permitted	0.244			0.178			0.743					
Satd. Flow (perm)	407	3197	1430	302	3164	0	1237	1374	0	1750	1393	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			715		1		223			20		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		1123.3			1937.5		3375.6			350.8		
Travel Time (s)		80.9			139.5		243.0			25.3		
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	14	711	715	242	811	5	691	3	223	0	2	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	14	711	715	242	816	0	691	226	0	0	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2027)
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9	
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	41.0	36.0	36.0	49.0	45.4		55.9	55.9		55.9	55.9	
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.40		0.50	0.50		0.50	0.50	
v/c Ratio	0.07	0.70	0.76	1.03	0.64		1.13	0.29		0.03	0.03	
Control Delay	19.4	38.1	8.3	93.6	30.8		106.2	3.2		6.6	6.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	19.4	38.1	8.3	93.6	30.8		106.2	3.2		6.6	6.6	
LOS	B	D	A	F	C		F	A		A	A	
Approach Delay		23.1			45.2			80.8			6.6	
Approach LOS		C			D			F			A	
Queue Length 50th (m)	1.8	75.7	0.0	-38.3	74.4		-186.3	0.4		0.3	0.3	
Queue Length 95th (m)	5.8	98.0	36.9	#89.6	109.7		#259.4	13.0		4.5	4.5	
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0					
Base Capacity (vph)	199	1019	942	235	1272		612	792			699	
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	0.70	0.76	1.03	0.64		1.13	0.29		0.03	0.03	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.13

Intersection Signal Delay: 45.2

Intersection LOS: D

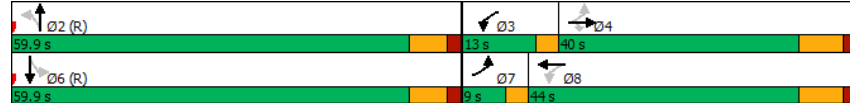
Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2027)
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Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2031 PM.syn
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Intersection Capacity Utilization 97.6%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

TT 2031 PM.syn
11-08-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↰	↰	↰	↰↰	↰	↰	↰	↰	↰	↰↰	↰
Traffic Volume (vph)	13	654	658	223	746	5	636	3	205	0	2	18
Future Volume (vph)	13	654	658	223	746	5	636	3	205	0	2	18
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.86
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1374				1392
Flt Permitted	0.24	1.00	1.00	0.18	1.00		0.74	1.00				1.00
Satd. Flow (perm)	407	3197	1430	302	3165		1237	1374				1392
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	711	715	242	811	5	691	3	223	0	2	20
RTOR Reduction (vph)	0	0	476	0	1	0	0	116	0	0	10	0
Lane Group Flow (vph)	14	711	239	242	815	0	691	110	0	0	12	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8		2				6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1	
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1	
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	138	1070	478	227	1272		592	658			667	
v/s Ratio Prot	0.00	0.22		c0.08	0.26			0.08			0.01	
v/s Ratio Perm	0.03		0.17	c0.35			c0.56					
v/c Ratio	0.10	0.66	0.50	1.07	0.64		1.17	0.17			0.02	
Uniform Delay, d1	28.0	32.1	30.0	29.2	27.2		29.4	16.6			15.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.4	3.3	3.7	78.3	2.5		92.5	0.5			0.0	
Delay (s)	28.5	35.4	33.7	107.6	29.7		121.9	17.2			15.5	
Level of Service	C	D	C	F	C		F	B			B	
Approach Delay (s)		34.5			47.5			96.1			15.5	
Approach LOS		C			D			F			B	
Intersection Summary												
HCM 2000 Control Delay		54.8										
HCM 2000 Volume to Capacity ratio		1.10										
Actuated Cycle Length (s)		112.9			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		97.6%			ICU Level of Service			F				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2031 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	8	0	7	8	3	6	6	527	7	5	615	8
Future Volume (vph)	8	0	7	8	3	6	6	527	7	5	615	8
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.936			0.950				0.850			0.850
Flt Protected		0.974			0.977			0.999				
Satd. Flow (prot)	0	1595	0	0	1624	0	0	1682	1488	0	1697	1488
Flt Permitted		0.974			0.977			0.999				
Satd. Flow (perm)	0	1595	0	0	1624	0	0	1682	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			1313.7	
Travel Time (s)		83.0			10.0			123.3			94.6	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	9	0	8	9	3	7	7	573	8	5	668	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	17	0	0	19	0	0	580	8	0	673	9
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 52.1%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2031 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	8	0	7	8	3	6	6	527	7	5	615	8
Future Volume (Veh/h)	8	0	7	8	3	6	6	527	7	5	615	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	9	0	8	9	3	7	7	573	8	5	668	9
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1274	1273	668	1273	1274	573	677			581		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1274	1273	668	1273	1274	573	677			581		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	94	100	98	94	98	99	99			99		
cM capacity (veh/h)	140	167	462	142	166	523	924			923		

Direction, Lane #

	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	17	19	580	8	673	9
Volume Left	9	9	7	0	5	0
Volume Right	8	7	0	8	0	9
cSH	209	200	924	1700	923	1700
Volume to Capacity	0.08	0.09	0.01	0.00	0.01	0.01
Queue Length 95th (m)	2.1	2.5	0.2	0.0	0.1	0.0
Control Delay (s)	23.8	24.9	0.2	0.0	0.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	23.8	24.9	0.2		0.1	
Approach LOS	C	C				

Intersection Summary

Average Delay	0.8
Intersection Capacity Utilization	52.1%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2031 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	3	1	1	2	0	3	3	543	9	6	624	2
Future Volume (vph)	3	1	1	2	0	3	3	543	9	6	624	2
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.973			0.919				0.850			0.850
Flt Protected		0.971			0.980						0.999	
Satd. Flow (prot)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Flt Permitted		0.971			0.980						0.999	
Satd. Flow (perm)	0	1653	0	0	1392	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	3	1	1	2	0	3	3	590	10	7	678	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	5	0	0	5	0	0	593	10	0	685	2
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 52.7%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2031 PM.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	3	1	1	2	0	3	3	543	9	6	624	2
Future Volume (Veh/h)	3	1	1	2	0	3	3	543	9	6	624	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	1	1	2	0	3	3	590	10	7	678	2
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1291	1298	678	1290	1290	590	680			600		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1291	1298	678	1290	1290	590	680			600		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	100	98	100	99	100			99		
cM capacity (veh/h)	140	161	456	119	163	511	922			987		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	593	10	685	2
Volume Left	3	2	3	0	7	0
Volume Right	1	3	0	10	0	2
cSH	167	221	922	1700	987	1700
Volume to Capacity	0.03	0.02	0.00	0.01	0.01	0.00
Queue Length 95th (m)	0.7	0.6	0.1	0.0	0.2	0.0
Control Delay (s)	27.2	21.7	0.1	0.0	0.2	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	27.2	21.7	0.1		0.2	
Approach LOS	D	C				

Intersection Summary

Average Delay	0.3
Intersection Capacity Utilization 52.7%	ICU Level of Service A
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2031 PM.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	24	7	5	57	11	17	0	512	48	22	577	26
Future Volume (vph)	24	7	5	57	11	17	0	512	48	22	577	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt	0.983				0.974				0.850			0.850
Flt Protected	0.968				0.967				0.950			
Satd. Flow (prot)	0	1502	0	0	1609	0	1716	1681	1400	1395	1709	1458
Flt Permitted	0.820				0.774				0.416			
Satd. Flow (perm)	0	1271	0	0	1288	0	1716	1681	1400	611	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	5				16				52			39
Link Speed (k/h)	50				50			50			50	
Link Distance (m)	388.1				2359.9			455.1			2151.0	
Travel Time (s)	27.9				169.9			32.8			154.9	
Confl. Peds. (#/hr)	1				1							
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	26	8	5	62	12	18	0	557	52	24	627	28
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	39	0	0	92	0	0	557	52	24	627	28
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0			3.6			3.6	
Link Offset(m)	0.0				0.0			0.0			0.0	
Crosswalk Width(m)	4.8				4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2027)
PTSL (200364)

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2031 PM.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		12.8			12.8			51.9	51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.76	0.76	0.76	0.76	0.76
v/c Ratio		0.16			0.36			0.44	0.05	0.05	0.49	0.03
Control Delay		22.9			25.2			5.8	1.4	4.0	6.3	1.2
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		22.9			25.2			5.8	1.4	4.0	6.3	1.2
LOS		C			C			A	A	A	A	A
Approach Delay		22.9			25.2			5.5			6.0	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		3.9			9.0			26.1	0.0	0.8	30.9	0.0
Queue Length 95th (m)		11.5			21.6			52.7	2.9	3.2	62.4	1.7
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)								190.0	55.0			15.0
Base Capacity (vph)		503			516			1271	1071	462	1292	1112
Starvation Cap Reductn		0			0			0	0	0	0	0
Spillback Cap Reductn		0			0			0	0	0	0	0
Storage Cap Reductn		0			0			0	0	0	0	0
Reduced v/c Ratio		0.08			0.18			0.44	0.05	0.05	0.49	0.03
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		68.7										
Natural Cycle:		55										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.49										
Intersection Signal Delay:		7.5						Intersection LOS: A				
Intersection Capacity Utilization		48.2%						ICU Level of Service A				

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2027)
PTSL (200364)

Synchro 11 Report
Page 10

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2031 PM.syn
11-08-2024

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2031 PM.syn
11-08-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	7	5	57	11	17	0	512	48	22	577	26
Future Volume (vph)	24	7	5	57	11	17	0	512	48	22	577	26
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1499			1609			1681	1400	1395	1709	1458
Flt Permitted		0.82			0.77			1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		1271			1287			1681	1400	611	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	26	8	5	62	12	18	0	557	52	24	627	28
RTOR Reduction (vph)	0	4	0	0	14	0	0	0	14	0	0	8
Lane Group Flow (vph)	0	35	0	0	78	0	0	557	38	24	627	20
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.8			8.8			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.8			10.8			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		196			198			1228	1023	446	1249	1065
v/s Ratio Prot								0.33			c0.37	
v/s Ratio Perm		0.03			c0.06				0.03	0.04		0.01
v/c Ratio		0.18			0.40			0.45	0.04	0.05	0.50	0.02
Uniform Delay, d1		25.7			26.6			3.8	2.6	2.6	4.0	2.6
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.4			1.3			1.2	0.1	0.2	1.4	0.0
Delay (s)		26.1			27.9			5.0	2.7	2.9	5.4	2.6
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.1			27.9			4.8			5.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.1			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		69.9			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		48.2%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2031 PM.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	135	62	450	574	48
Future Volume (vph)	87	135	62	450	574	48
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.918				0.990	
Flt Protected	0.981			0.994		
Satd. Flow (prot)	1261	0	0	1633	1670	0
Flt Permitted	0.981			0.994		
Satd. Flow (perm)	1261	0	0	1633	1670	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	95	147	67	489	624	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	242	0	0	556	676	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 89.6%	ICU Level of Service E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2031 PM.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	87	135	62	450	574	48
Future Volume (Veh/h)	87	135	62	450	574	48
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	95	147	67	489	624	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1273	650	676			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1273	650	676			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	37	66	92			
cM capacity (veh/h)	152	431	817			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	242	556	676			
Volume Left	95	67	0			
Volume Right	147	0	52			
cSH	250	817	1700			
Volume to Capacity	0.97	0.08	0.40			
Queue Length 95th (m)	72.1	2.1	0.0			
Control Delay (s)	91.2	2.2	0.0			
Lane LOS	F	A				
Approach Delay (s)	91.2	2.2	0.0			
Approach LOS	F					

Intersection Summary

Average Delay	15.8
Intersection Capacity Utilization 89.6%	ICU Level of Service E
Analysis Period (min)	15

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:56:14 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
< 10 Years - TT 2031							
Leg North	1.38	1.12	8.02	0.55	A	8.38	A
Leg West	0.25	~1	5.38	0.19	A		
Leg South	1.73	1.08	9.69	0.62	A		
Leg East	0.11	~1	6.31	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:56:13 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - TT 2031, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2031, AM	TT 2031	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				8.38	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	567.00	100.000
West	ONE HOUR	✓	151.00	100.000
South	ONE HOUR	✓	591.00	100.000
East	ONE HOUR	✓	56.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	114.000	407.000	46.000
	West	113.000	0.000	36.000	2.000
	South	537.000	31.000	0.000	23.000
	East	46.000	0.000	10.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.20	0.72	0.08
	West	0.75	0.00	0.24	0.01
	South	0.91	0.05	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.55	8.02	1.38	1.12	A	520.29	780.43	88.04	6.77	0.98	88.06	6.77
West	0.19	5.38	0.25	~1	A	138.56	207.84	16.97	4.90	0.19	16.97	4.90
South	0.62	9.69	1.73	1.08	A	542.31	813.47	104.63	7.72	1.16	104.65	7.72
East	0.09	6.31	0.11	~1	A	51.39	77.08	7.30	5.68	0.08	7.30	5.68

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	426.87	106.72	424.19	520.67	30.67	0.00	1136.08	1084.46	0.376	0.00	0.67	5.651	A
West	113.68	28.42	113.12	108.47	346.39	0.00	953.35	608.35	0.119	0.00	0.14	4.435	A
South	444.94	111.23	441.97	338.95	120.57	0.00	1084.05	834.76	0.410	0.00	0.74	6.022	A
East	42.16	10.54	41.92	53.11	509.42	0.00	859.00	426.02	0.049	0.00	0.06	5.081	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	509.72	127.43	508.77	624.40	36.78	0.00	1132.54	1084.46	0.450	0.67	0.91	6.472	A
West	135.75	33.94	135.58	130.10	415.45	0.00	913.38	608.35	0.149	0.14	0.18	4.793	A

South	531.30	132.82	530.08	406.50	144.54	0.00	1070.18	834.76	0.496	0.74	1.05	7.176	A
East	50.34	12.59	50.27	63.70	610.91	0.00	800.26	426.02	0.063	0.06	0.08	5.536	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	624.28	156.07	622.45	763.62	44.98	0.00	1127.79	1084.46	0.554	0.91	1.36	7.959	A
West	166.25	41.56	165.99	159.14	508.29	0.00	859.65	608.35	0.193	0.18	0.25	5.376	A
South	650.70	162.68	648.07	497.36	176.91	0.00	1051.44	834.76	0.619	1.05	1.71	9.565	A
East	61.66	15.41	61.54	77.92	747.06	0.00	721.46	426.02	0.085	0.08	0.11	6.293	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	624.28	156.07	624.23	766.22	45.14	0.00	1127.71	1084.46	0.554	1.36	1.38	8.016	A
West	166.25	41.56	166.25	159.63	509.73	0.00	858.82	608.35	0.194	0.25	0.25	5.384	A
South	650.70	162.68	650.61	498.72	177.26	0.00	1051.24	834.76	0.619	1.71	1.73	9.689	A
East	61.66	15.41	61.65	78.16	749.70	0.00	719.93	426.02	0.086	0.11	0.11	6.307	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	509.72	127.43	511.51	628.34	37.02	0.00	1132.41	1084.46	0.450	1.38	0.93	6.522	A
West	135.75	33.94	136.01	130.85	417.68	0.00	912.09	608.35	0.149	0.25	0.18	4.806	A
South	531.30	132.82	533.89	408.61	145.08	0.00	1069.86	834.76	0.497	1.73	1.08	7.283	A
East	50.34	12.59	50.46	64.08	614.89	0.00	797.95	426.02	0.063	0.11	0.08	5.555	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	426.87	106.72	427.86	525.33	30.95	0.00	1135.92	1084.46	0.376	0.93	0.68	5.711	A
West	113.68	28.42	113.84	109.43	349.38	0.00	951.62	608.35	0.119	0.18	0.14	4.453	A
South	444.94	111.23	446.22	341.81	121.41	0.00	1083.56	834.76	0.411	1.08	0.76	6.108	A
East	42.16	10.54	42.23	53.59	514.05	0.00	856.32	426.02	0.049	0.08	0.06	5.102	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	9.67	0.64	5.651	A	A
West	2.04	0.14	4.435	A	A
South	10.71	0.71	6.022	A	A
East	0.87	0.06	5.081	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.21	0.88	6.472	A	A
West	2.65	0.18	4.793	A	A
South	15.20	1.01	7.176	A	A
East	1.13	0.08	5.536	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.66	1.31	7.959	A	A
West	3.63	0.24	5.376	A	A
South	24.29	1.62	9.565	A	A

East	1.57	0.10	6.293	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	20.58	1.37	8.016	A	A
West	3.71	0.25	5.384	A	A
South	25.80	1.72	9.689	A	A
East	1.61	0.11	6.307	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.42	0.96	6.522	A	A
West	2.79	0.19	4.806	A	A
South	16.88	1.13	7.283	A	A
East	1.20	0.08	5.555	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.50	0.70	5.711	A	A
West	2.16	0.14	4.453	A	A
South	11.75	0.78	6.108	A	A
East	0.92	0.06	5.102	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.67	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.74	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.91	0.00	0.00	0.00	1.12			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.05	0.00	0.00	1.08	1.08			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.36	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.71	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.38	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.73	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.93	0.00	0.00	0.00	1.12			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.08	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.68	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.76	0.00	0.00	1.08	1.08			N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:56:38 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	< 10 Years - TT 2031						
Leg North	2.38	4.12	11.07	0.70	B	9.15	A
Leg West	0.25	~1	6.01	0.19	A		
Leg South	1.26	?	7.73	0.55	A		
Leg East	0.10	~1	5.90	0.08	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:56:37 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

< 10 Years - TT 2031, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
< 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2031, PM	TT 2031	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				9.15	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		85.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1153.828
West		(calculated)	(calculated)	0.579	1153.828
South		(calculated)	(calculated)	0.579	1153.828
East		(calculated)	(calculated)	0.579	1153.828

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	715.00	100.000
West	ONE HOUR	✓	134.00	100.000
South	ONE HOUR	✓	537.00	100.000
East	ONE HOUR	✓	58.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	122.000	560.000	33.000
	West	78.000	0.000	53.000	3.000
	South	456.000	42.000	0.000	39.000
	East	49.000	0.000	9.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.17	0.78	0.05
	West	0.58	0.00	0.40	0.02
	South	0.85	0.08	0.00	0.07
	East	0.84	0.00	0.16	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.70	11.07	2.38	4.12	B	656.10	984.14	137.30	8.37	1.53	137.32	8.37
West	0.19	6.01	0.25	~1	A	122.96	184.44	16.44	5.35	0.18	16.44	5.35
South	0.55	7.73	1.26	?	A	492.76	739.14	79.92	6.49	0.89	79.93	6.49
East	0.08	5.90	0.10	~1	A	53.22	79.83	7.21	5.42	0.08	7.21	5.42

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	538.29	134.57	534.60	436.36	38.17	0.00	1131.74	1071.00	0.476	0.00	0.92	6.167	A
West	100.88	25.22	100.36	122.65	450.12	0.00	893.32	598.37	0.113	0.00	0.13	4.716	A
South	404.28	101.07	401.87	465.14	85.34	0.00	1104.44	915.88	0.366	0.00	0.60	5.372	A
East	43.67	10.92	43.43	56.11	431.10	0.00	904.32	460.67	0.048	0.00	0.06	4.958	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	642.77	160.69	641.10	523.21	45.77	0.00	1127.34	1071.00	0.570	0.92	1.34	7.594	A
West	120.46	30.12	120.30	147.08	539.79	0.00	841.42	598.37	0.143	0.13	0.17	5.188	A

South	482.75	120.69	481.88	557.78	102.31	0.00	1094.62	915.88	0.441	0.60	0.82	6.171	A
East	52.14	13.04	52.07	67.28	516.91	0.00	854.66	460.67	0.061	0.06	0.08	5.319	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	787.23	196.81	783.25	640.19	56.00	0.00	1121.42	1071.00	0.702	1.34	2.33	10.827	B
West	147.54	36.88	147.25	179.76	659.50	0.00	772.14	598.37	0.191	0.17	0.24	5.986	A
South	591.25	147.81	589.54	681.59	125.16	0.00	1081.39	915.88	0.547	0.82	1.25	7.673	A
East	63.86	15.96	63.75	82.26	632.44	0.00	787.80	460.67	0.081	0.08	0.10	5.897	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	787.23	196.81	787.06	641.85	56.15	0.00	1121.33	1071.00	0.702	2.33	2.38	11.068	B
West	147.54	36.88	147.53	180.53	662.67	0.00	770.30	598.37	0.192	0.24	0.25	6.008	A
South	591.25	147.81	591.20	684.70	125.50	0.00	1081.19	915.88	0.547	1.25	1.26	7.727	A
East	63.86	15.96	63.86	82.57	634.14	0.00	786.81	460.67	0.081	0.10	0.10	5.905	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	642.77	160.69	646.71	525.77	46.00	0.00	1127.21	1071.00	0.570	2.38	1.39	7.774	A
West	120.46	30.12	120.74	148.24	544.47	0.00	838.71	598.37	0.144	0.25	0.18	5.214	A
South	482.75	120.69	484.42	562.38	102.83	0.00	1094.31	915.88	0.441	1.26	0.84	6.225	A
East	52.14	13.04	52.25	67.73	519.52	0.00	853.15	460.67	0.061	0.10	0.08	5.331	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	538.29	134.57	540.07	439.84	38.48	0.00	1131.56	1071.00	0.476	1.39	0.95	6.282	A
West	100.88	25.22	101.05	123.84	454.71	0.00	890.66	598.37	0.113	0.18	0.13	4.742	A
South	404.28	101.07	405.19	469.75	86.01	0.00	1104.05	915.88	0.366	0.84	0.61	5.427	A
East	43.67	10.92	43.73	56.62	434.58	0.00	902.31	460.67	0.048	0.08	0.06	4.974	A

Queueing Delay Results for each time segment**Queueing Delay results: (16:30-16:45)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.24	0.88	6.167	A	A
West	1.93	0.13	4.716	A	A
South	8.72	0.58	5.372	A	A
East	0.88	0.06	4.958	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.33	1.29	7.594	A	A
West	2.54	0.17	5.188	A	A
South	11.97	0.80	6.171	A	A
East	1.13	0.08	5.319	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	32.74	2.18	10.827	B	B
West	3.57	0.24	5.986	A	A
South	17.97	1.20	7.673	A	A

East	1.53	0.10	5.897	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	35.40	2.36	11.068	B	B
West	3.67	0.24	6.008	A	A
South	18.80	1.25	7.727	A	A
East	1.56	0.10	5.905	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.90	1.46	7.774	A	A
West	2.69	0.18	5.214	A	A
South	13.02	0.87	6.225	A	A
East	1.19	0.08	5.331	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.67	0.98	6.282	A	A
West	2.04	0.14	4.742	A	A
South	9.44	0.63	5.427	A	A
East	0.93	0.06	4.974	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.92	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.34	0.00	0.00	2.06	3.09			N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.33	0.00	0.00	0.00	4.12			N/A	N/A
West	0.24	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.25	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.38	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.25	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.26	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.39	0.00	0.00	2.06	3.09			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.84	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.95	0.00	0.00	1.03	2.06			N/A	N/A
West	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.61	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2036 AM PH2.syn

11-08-2024

	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	5	634	623	181	567	3	691	4	232	3	5	13
Future Volume (vph)	5	634	623	181	567	3	691	4	232	3	5	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1388	0
Flt Permitted	0.369			0.145			0.745			0.559		
Satd. Flow (perm)	646	3167	1340	223	3105	0	1229	1395	0	978	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			677					252			14	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	5	689	677	197	619	3	751	4	252	3	5	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	689	677	197	619	0	751	256	0	3	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH2)
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2036 AM PH2.syn

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	↖	→	↘	↙	←	↖	↙	↘	↗	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8				2			6	
Detector Phase	7	4	4	3	8			2	2		6	6
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.02	0.95	0.82	1.05	0.59		1.06	0.28		0.01	0.02	
Control Delay	24.4	65.6	12.2	110.2	34.3		77.4	2.3		10.3	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	65.6	12.2	110.2	34.3		77.4	2.3		10.3	5.8	
LOS	C	E	B	F	C		E	A		B	A	
Approach Delay		39.1			52.6			58.3			6.4	
Approach LOS		D			D			E			A	
Queue Length 50th (m)	0.8	83.2	0.0	~35.0	60.4		~192.6	0.4		0.3	0.5	
Queue Length 95th (m)	3.5	#121.1	47.1	#82.8	90.1		#267.2	11.5		1.6	3.8	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	222	729	829	188	1050		706	909		562	803	
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	0.02	0.95	0.82	1.05	0.59		1.06	0.28		0.01	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 48.3

Intersection LOS: D

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH2)
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Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

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Intersection Capacity Utilization 92.8%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

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	↖	→	↗	↙	←	↖	↗	↙	↘	↗	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖	↖↗	↖	↖	↖↗	↖	
Traffic Volume (vph)	5	634	623	181	567	3	691	4	232	3	5	13	
Future Volume (vph)	5	634	623	181	567	3	691	4	232	3	5	13	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89		
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1388		
Flt Permitted	0.37	1.00	1.00	0.15	1.00		0.75	1.00		0.56	1.00		
Satd. Flow (perm)	646	3167	1340	223	3106		1229	1395		978	1388		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	5	689	677	197	616	3	751	4	252	3	5	14	
RTOR Reduction (vph)	0	0	507	0	0	0	0	112	0	0	6	0	
Lane Group Flow (vph)	5	689	170	197	619	0	751	144	0	3	13	0	
Confl. Peds. (#/hr)							1					1	
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	7	4		3	8			2			6		
Permitted Phases	4		4	8			2			6			
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5		
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5		
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55		
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0		
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	137	796	337	183	1050		680	772		541	768		
v/s Ratio Prot	0.00	0.22		c0.10	0.20			0.10			0.01		
v/s Ratio Perm	0.01		0.13	c0.26			c0.61			0.00			
v/c Ratio	0.04	0.87	0.51	1.08	0.59		1.10	0.19		0.01	0.02		
Uniform Delay, d1	35.9	40.4	36.2	32.6	30.9		25.2	12.5		11.3	11.4		
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.1	12.1	5.3	88.4	2.4		66.7	0.5		0.0	0.0		
Delay (s)	36.1	52.6	41.6	120.9	33.3		91.9	13.1		11.3	11.4		
Level of Service	D	D	D	F	C		F	B		B	B		
Approach Delay (s)		47.1			54.5			71.9			11.4		
Approach LOS		D			D			E			B		
Intersection Summary													
HCM 2000 Control Delay		56.5					HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio		1.07											
Actuated Cycle Length (s)		112.9					Sum of lost time (s)			12.0			
Intersection Capacity Utilization		92.8%					ICU Level of Service			F			
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2036 AM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	6	1	1	3	0	9	4	711	4	1	431	4
Future Volume (vph)	6	1	1	3	0	9	4	711	4	1	431	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.985			0.896				0.850			0.850
Flt Protected		0.963			0.989							
Satd. Flow (prot)	0	1321	0	0	1551	0	0	1606	1488	0	1563	1488
Flt Permitted		0.963			0.989							
Satd. Flow (perm)	0	1321	0	0	1551	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			1318.9
Travel Time (s)		83.0			10.0				123.3			95.0
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	7	1	1	3	0	10	4	773	4	1	468	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	13	0	0	777	4	0	469	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 57.5%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2036 AM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	6	1	1	3	0	9	4	711	4	1	431	4
Future Volume (Veh/h)	6	1	1	3	0	9	4	711	4	1	431	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	1	1	3	0	10	4	773	4	1	468	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1261	1255	468	1252	1255	773	472			777		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1261	1255	468	1252	1255	773	472			777		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	100	98	100	98	100			100		
cM capacity (veh/h)	123	172	599	149	172	402	1100			848		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	13	777	4	469	4						
Volume Left	7	3	4	0	1	0						
Volume Right	1	10	0	4	0	4						
cSH	140	289	1100	1700	848	1700						
Volume to Capacity	0.06	0.05	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	1.6	1.1	0.1	0.0	0.0	0.0						
Control Delay (s)	32.4	18.0	0.1	0.0	0.0	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	32.4	18.0	0.1		0.0							
Approach LOS	D	C										

Intersection Summary

Average Delay 0.5

Intersection Capacity Utilization 57.5%

ICU Level of Service

B

Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2036 AM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	5	10	0	3	3	705	3	1	435	0
Future Volume (vph)	1	0	5	10	0	3	3	705	3	1	435	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.887			0.971				0.850			
Flt Protected		0.992			0.962							
Satd. Flow (prot)	0	1540	0	0	1577	0	0	1606	1118	0	1560	1750
Flt Permitted		0.992			0.962							
Satd. Flow (perm)	0	1540	0	0	1577	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	5	11	0	3	3	766	3	1	473	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	14	0	0	769	3	0	474	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 52.9%	ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2036 AM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	5	10	0	3	3	705	3	1	435	0
Future Volume (Veh/h)	1	0	5	10	0	3	3	705	3	1	435	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	5	11	0	3	3	766	3	1	473	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1250	1250	473	1252	1247	766	473			769		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1250	1250	473	1252	1247	766	473			769		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	93	100	99	100			100		
cM capacity (veh/h)	149	173	595	149	174	380	1099			534		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	6	14	769	3	474	0						
Volume Left	1	11	3	0	1	0						
Volume Right	5	3	0	3	0	0						
cSH	397	171	1099	1700	534	1700						
Volume to Capacity	0.02	0.08	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	0.4	2.1	0.1	0.0	0.0	0.0						
Control Delay (s)	14.2	27.9	0.1	0.0	0.1	0.0						
Lane LOS	B	D	A		A							
Approach Delay (s)	14.2	27.9	0.1		0.1							
Approach LOS	B	D										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			52.9%				ICU Level of Service			A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 AM PH2.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	19	8	0	33	11	24	4	665	30	34	395	24
Future Volume (vph)	19	8	0	33	11	24	4	665	30	34	395	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			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					0.953				0.850			0.850
Flt Protected	0.966				0.976		0.950			0.950		
Satd. Flow (prot)	0	1294	0	0	1274	0	1662	1636	1305	1087	1606	1118
Flt Permitted	0.814				0.835		0.495			0.326		
Satd. Flow (perm)	0	1091	0	0	1090	0	866	1636	1305	373	1606	1118
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26				39			39
Link Speed (k/h)	50				50				50			50
Link Distance (m)	388.1				2359.9				455.1			2151.0
Travel Time (s)	27.9				169.9				32.8			154.9
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Adj. Flow (vph)	21	9	0	36	12	26	4	723	33	37	429	26
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	30	0	0	74	0	4	723	33	37	429	26
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			3.6
Link Offset(m)	0.0				0.0				0.0			0.0
Crosswalk Width(m)	4.8				4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH2)
PTSL 200364

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 AM PH2.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	11.0	11.0										
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		12.6			12.6		51.9	51.9	51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.18			0.18		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio		0.15			0.33		0.01	0.58	0.03	0.13	0.35	0.03
Control Delay		25.5			22.0		3.5	7.6	1.3	5.0	5.0	1.0
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		25.5			22.0		3.5	7.6	1.3	5.0	5.0	1.0
LOS		C			C		A	A	A	A	A	A
Approach Delay		25.5			22.0			7.3			4.8	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		3.4			5.6		0.2	40.4	0.0	1.3	18.3	0.0
Queue Length 95th (m)		10.3			16.8		0.9	81.5	2.0	4.9	36.2	1.5
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)							110.0		190.0	55.0		15.0
Base Capacity (vph)		431			446		657	1241	1000	283	1219	858
Starvation Cap Reductn		0			0		0	0	0	0	0	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.07			0.17		0.01	0.58	0.03	0.13	0.35	0.03

Intersection Summary

Area Type: Other

Cycle Length: 83

Actuated Cycle Length: 68.4

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 7.6

Intersection LOS: A

Intersection Capacity Utilization 53.0%

ICU Level of Service A

Analysis Period (min) 15

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH2)
PTSL 200364

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 AM PH2.syn
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Splits and Phases: 6: Highway 140 & Concession 2 Road

52 s	31 s
52 s	31 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2036 AM PH2.syn
11-08-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	8	0	33	11	24	4	665	30	34	395	24
Future Volume (vph)	19	8	0	33	11	24	4	665	30	34	395	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1295			1274		1662	1636	1305	1087	1606	1118
Flt Permitted		0.81			0.83		0.49	1.00	1.00	0.33	1.00	1.00
Satd. Flow (perm)		1090			1089		866	1636	1305	373	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	9	0	36	12	26	4	723	33	37	429	26
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	9	0	0	7
Lane Group Flow (vph)	0	30	0	0	52	0	4	723	24	37	429	19
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.5			8.5		48.1	48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.5			10.5		51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15		0.73	0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		164			164		635	1201	958	273	1179	820
v/s Ratio Prot								c0.44				0.27
v/s Ratio Perm		0.03			c0.05		0.00		0.02	0.10		0.02
v/c Ratio		0.18			0.32		0.01	0.60	0.03	0.14	0.36	0.02
Uniform Delay, d1		25.8			26.4		2.5	4.4	2.5	2.7	3.4	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.1		0.0	2.2	0.0	1.0	0.9	0.1
Delay (s)		26.3			27.5		2.5	6.6	2.6	3.8	4.2	2.6
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.3			27.5			6.4			4.1	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.2		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			69.6		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			53.0%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2036 AM PH2.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	43	45	113	605	404	88
Future Volume (vph)	43	45	113	605	404	88
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.931				0.976	
Flt Protected	0.976			0.992		
Satd. Flow (prot)	1272	0	0	1569	1494	0
Flt Permitted	0.976			0.992		
Satd. Flow (perm)	1272	0	0	1569	1494	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	47	49	123	658	439	96
Shared Lane Traffic (%)						
Lane Group Flow (vph)	96	0	0	781	535	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 85.8%	ICU Level of Service E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2036 AM PH2.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	45	113	605	404	88
Future Volume (Veh/h)	43	45	113	605	404	88
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	49	123	658	439	96
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1391	487	535			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1391	487	535			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	61	91	87			
cM capacity (veh/h)	121	537	926			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	96	781	535			
Volume Left	47	123	0			
Volume Right	49	0	96			
cSH	200	926	1700			
Volume to Capacity	0.48	0.13	0.31			
Queue Length 95th (m)	18.7	3.7	0.0			
Control Delay (s)	38.5	3.2	0.0			
Lane LOS	E	A				
Approach Delay (s)	38.5	3.2	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay		4.4				
Intersection Capacity Utilization		85.8%		ICU Level of Service	E	
Analysis Period (min)		15				

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2036 PM PH2.syn

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	↖	→	↗	↘	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	14	723	723	246	824	5	694	4	226	0	3	20
Future Volume (vph)	14	723	723	246	824	5	694	4	226	0	3	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.868	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1375	0	1750	1403	0
Flt Permitted	0.196			0.139			0.741					
Satd. Flow (perm)	327	3197	1430	236	3164	0	1234	1375	0	1750	1403	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			786		1		228			22		
Link Speed (k/h)		50			50		50			50		
Link Distance (m)		1123.3			1937.5		3375.6			350.8		
Travel Time (s)		80.9			139.5		243.0			25.3		
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	15	786	786	267	896	5	754	4	246	0	3	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	786	786	267	901	0	754	250	0	0	25	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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	↖	→	↗	↘	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9	
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	41.0	36.0	36.0	49.0	45.4		55.9	55.9		55.9		
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.40		0.50	0.50		0.50		
v/c Ratio	0.09	0.77	0.79	1.26	0.71		1.24	0.31		0.04		
Control Delay	19.7	40.8	9.1	173.7	32.8		147.9	3.9		6.6		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0		
Total Delay	19.7	40.8	9.1	173.7	32.8		147.9	3.9		6.6		
LOS	B	D	A	F	C		F	A		A		
Approach Delay		24.9			65.0			112.0			6.6	
Approach LOS		C			E			F			A	
Queue Length 50th (m)	1.9	86.4	0.0	-57.4	85.2		-217.2	2.6		0.4		
Queue Length 95th (m)	6.1	110.5	40.8	#111.6	124.9		#291.8	16.2		4.9		
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0					
Base Capacity (vph)	174	1019	991	212	1272		610	795		705		
Starvation Cap Reductn	0	0	0	0	0		0	0		0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0		
Storage Cap Reductn	0	0	0	0	0		0	0		0		
Reduced v/c Ratio	0.09	0.77	0.79	1.26	0.71		1.24	0.31		0.04		

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.26

Intersection Signal Delay: 60.3

Intersection LOS: E

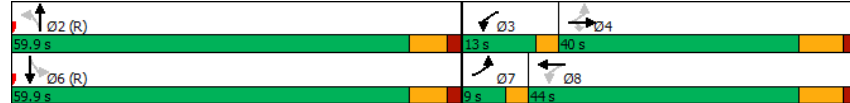
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Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

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Intersection Capacity Utilization 103.4%	ICU Level of Service G
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

TT 2036 PM PH2.syn
11-08-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Traffic Volume (vph)	14	723	723	246	824	5	694	4	226	0	3	20
Future Volume (vph)	14	723	723	246	824	5	694	4	226	0	3	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.87
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1375				1403
Flt Permitted	0.20	1.00	1.00	0.14	1.00		0.74	1.00				1.00
Satd. Flow (perm)	326	3197	1430	236	3165		1234	1375				1403
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	786	786	267	896	5	754	4	246	0	3	22
RTOR Reduction (vph)	0	0	523	0	1	0	0	119	0	0	11	0
Lane Group Flow (vph)	15	786	263	267	900	0	754	131	0	0	14	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8		2				6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1	
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1	
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	114	1070	478	205	1272		591	658			672	
v/s Ratio Prot	0.00	0.25		c0.10	0.28			0.10			0.01	
v/s Ratio Perm	0.04		0.18	c0.42			c0.61					
v/c Ratio	0.13	0.73	0.55	1.30	0.71		1.28	0.20			0.02	
Uniform Delay, d1	28.3	33.1	30.6	27.7	28.2		29.4	16.9			15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	4.5	4.5	166.9	3.3		136.9	0.7			0.1	
Delay (s)	29.1	37.6	35.1	194.7	31.6		166.3	17.6			15.5	
Level of Service	C	D	D	F	C		F	B			B	
Approach Delay (s)		36.3			68.8			129.3			15.5	
Approach LOS		D			E			F			B	
Intersection Summary												
HCM 2000 Control Delay		70.9										
HCM 2000 Volume to Capacity ratio		1.26										
Actuated Cycle Length (s)		112.9			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		103.4%			ICU Level of Service			G				
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

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11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	9	0	8	9	4	6	6	576	8	5	665	9
Future Volume (vph)	9	0	8	9	4	6	6	576	8	5	665	9
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.936			0.955				0.850			0.850
Flt Protected		0.974			0.977			0.999				
Satd. Flow (prot)	0	1595	0	0	1633	0	0	1682	1488	0	1697	1488
Flt Permitted		0.974			0.977			0.999				
Satd. Flow (perm)	0	1595	0	0	1633	0	0	1682	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			1313.7	
Travel Time (s)		83.0			10.0			123.3			94.6	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	10	0	9	10	4	7	7	626	9	5	723	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	21	0	0	633	9	0	728	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 55.0%

ICU Level of Service A

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2036 PM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	9	0	8	9	4	6	6	576	8	5	665	9
Future Volume (Veh/h)	9	0	8	9	4	6	6	576	8	5	665	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	10	0	9	10	4	7	7	626	9	5	723	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1382	1382	723	1382	1383	626	733			635		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1382	1382	723	1382	1383	626	733			635		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	91	100	98	92	97	99	99			99		
cM capacity (veh/h)	117	143	430	119	143	488	881			880		

Direction, Lane #

	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	19	21	633	9	728	10
Volume Left	10	10	7	0	5	0
Volume Right	9	7	0	9	0	10
cSH	178	166	881	1700	880	1700
Volume to Capacity	0.11	0.13	0.01	0.01	0.01	0.01
Queue Length 95th (m)	2.8	3.4	0.2	0.0	0.1	0.0
Control Delay (s)	27.6	29.8	0.2	0.0	0.2	0.0
Lane LOS	D	D	A		A	
Approach Delay (s)	27.6	29.8	0.2		0.1	
Approach LOS	D	D				

Intersection Summary

Average Delay	1.0
Intersection Capacity Utilization	55.0%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2036 PM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	4	1	1	3	0	4	4	593	10	6	675	3
Future Volume (vph)	4	1	1	3	0	4	4	593	10	6	675	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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			0.923				0.850			0.850
Flt Protected		0.968			0.979							
Satd. Flow (prot)	0	1655	0	0	1385	0	0	1683	1271	0	1716	1488
Flt Permitted		0.968			0.979							
Satd. Flow (perm)	0	1655	0	0	1385	0	0	1683	1271	0	1716	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	4	1	1	3	0	4	4	645	11	7	734	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	7	0	0	649	11	0	741	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	55.6%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2036 PM PH2.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	4	1	1	3	0	4	4	593	10	6	675	3
Future Volume (Veh/h)	4	1	1	3	0	4	4	593	10	6	675	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	1	1	3	0	4	4	645	11	7	734	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1405	1412	734	1402	1404	645	737			656		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1405	1412	734	1402	1404	645	737			656		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	100	97	100	99	100			99		
cM capacity (veh/h)	116	138	423	99	139	476	878			941		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	7	649	11	741	3
Volume Left	4	3	4	0	7	0
Volume Right	1	4	0	11	0	3
cSH	136	181	878	1700	941	1700
Volume to Capacity	0.04	0.04	0.00	0.01	0.01	0.00
Queue Length 95th (m)	1.1	1.0	0.1	0.0	0.2	0.0
Control Delay (s)	32.7	25.7	0.1	0.0	0.2	0.0
Lane LOS	D	D	A		A	
Approach Delay (s)	32.7	25.7	0.1	0.2		
Approach LOS	D	D				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 PM PH2.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	27	8	5	63	13	19	0	559	53	24	623	29
Future Volume (vph)	27	8	5	63	13	19	0	559	53	24	623	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt	0.984			0.972					0.850		0.850	
Flt Protected	0.967			0.968					0.950			
Satd. Flow (prot)	0	1502	0	0	1607	0	1716	1681	1400	1395	1709	1458
Flt Permitted	0.806			0.775					0.386			
Satd. Flow (perm)	0	1250	0	0	1287	0	1716	1681	1400	567	1709	1458
Right Turn on Red			Yes			Yes			Yes		Yes	
Satd. Flow (RTOR)	5			16					58			39
Link Speed (k/h)	50			50				50		50		
Link Distance (m)	388.1			2359.9				455.1		2151.0		
Travel Time (s)	27.9			169.9				32.8		154.9		
Confl. Peds. (#/hr)	1				1							
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	29	9	5	68	14	21	0	608	58	26	677	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	103	0	0	608	58	26	677	32
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0				3.6		3.6		
Link Offset(m)	0.0			0.0				0.0		0.0		
Crosswalk Width(m)	4.8			4.8				4.8		4.8		
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2036 PH2)
PTSL (200364)

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 PM PH2.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			2	6	
Detector Phase	4	4		8	8		2	2		2	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0		22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0		52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0		-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max		Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		13.2			13.2			51.9		51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.75		0.75	0.75	0.75
v/c Ratio		0.18			0.40			0.48		0.05	0.06	0.53
Control Delay		23.1			25.9			6.5		1.4	4.3	7.1
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		23.1			25.9			6.5		1.4	4.3	7.1
LOS		C			C			A		A	A	A
Approach Delay		23.1			25.9			6.1			6.7	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		4.4			10.4			29.7		0.0	0.9	35.0
Queue Length 95th (m)		12.3			23.8			63.6		3.2	3.7	74.9
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)								190.0		55.0		15.0
Base Capacity (vph)		492			513			1265		1068	427	1286
Starvation Cap Reductn		0			0			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.09			0.20			0.48		0.05	0.06	0.53
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		69										
Natural Cycle:		60										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.53										
Intersection Signal Delay:		8.2						Intersection LOS: A				
Intersection Capacity Utilization		50.8%						ICU Level of Service A				

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2036 PH2)
PTSL (200364)

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 PM PH2.syn
11-08-2024

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2036 PM PH2.syn
11-08-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	8	5	63	13	19	0	559	53	24	623	29
Future Volume (vph)	27	8	5	63	13	19	0	559	53	24	623	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1501			1608			1681	1400	1395	1709	1458
Flt Permitted		0.81			0.77			1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)		1251			1287			1681	1400	566	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	9	5	68	14	21	0	608	58	26	677	32
RTOR Reduction (vph)	0	4	0	0	13	0	0	0	16	0	0	9
Lane Group Flow (vph)	0	39	0	0	90	0	0	608	42	26	677	23
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.1			9.1			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		11.1			11.1			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.16			0.16			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		197			203			1223	1019	412	1244	1061
v/s Ratio Prot								0.36			c0.40	
v/s Ratio Perm		0.03			c0.07				0.03	0.05		0.02
v/c Ratio		0.20			0.44			0.50	0.04	0.06	0.54	0.02
Uniform Delay, d1		25.7			26.7			4.1	2.7	2.7	4.3	2.6
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.5			1.4	0.1	0.3	1.7	0.0
Delay (s)		26.2			28.3			5.5	2.8	3.0	6.0	2.7
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.2			28.3			5.3			5.8	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.6			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		70.2			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		50.8%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2036 PM PH2.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	87	135	62	497	635	48
Future Volume (vph)	87	135	62	497	635	48
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.918			0.991		
Flt Protected	0.981			0.995		
Satd. Flow (prot)	1261	0	0	1638	1674	0
Flt Permitted	0.981			0.995		
Satd. Flow (perm)	1261	0	0	1638	1674	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	95	147	67	540	690	52
Shared Lane Traffic (%)						
Lane Group Flow (vph)	242	0	0	607	742	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 95.8%	ICU Level of Service F
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2036 PM PH2.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	87	135	62	497	635	48
Future Volume (Veh/h)	87	135	62	497	635	48
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	95	147	67	540	690	52
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1390	716	742			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1390	716	742			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	26	63	91			
cM capacity (veh/h)	128	394	770			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	242	607	742			
Volume Left	95	67	0			
Volume Right	147	0	52			
cSH	217	770	1700			
Volume to Capacity	1.12	0.09	0.44			
Queue Length 95th (m)	90.0	2.3	0.0			
Control Delay (s)	143.2	2.3	0.0			
Lane LOS	F	A				
Approach Delay (s)	143.2	2.3	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		22.6				
Intersection Capacity Utilization		95.8%		ICU Level of Service	F	
Analysis Period (min)		15				

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:58:25 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - TT 2036 (PH2)						
Leg North	1.47	1.12	7.87	0.57	A	8.34	A
Leg West	0.26	~1	5.19	0.20	A		
Leg South	1.91	2.16	9.80	0.64	A		
Leg East	0.12	~1	6.12	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:58:25 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - TT 2036 (PH2), AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2036 (PH2), AM	TT 2036 (PH2)	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				8.34	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	618.00	100.000
West	ONE HOUR	✓	166.00	100.000
South	ONE HOUR	✓	647.00	100.000
East	ONE HOUR	✓	62.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.000	126.000	441.000	51.000
	West	124.000	0.000	39.000	3.000
	South	588.000	34.000	0.000	25.000
	East	51.000	0.000	11.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.20	0.71	0.08
	West	0.75	0.00	0.23	0.02
	South	0.91	0.05	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.57	7.87	1.47	1.12	A	567.09	850.63	93.41	6.59	1.04	93.42	6.59
West	0.20	5.19	0.26	~1	A	152.32	228.49	17.91	4.70	0.20	17.91	4.70
South	0.64	9.80	1.91	2.16	A	593.70	890.55	113.77	7.67	1.26	113.79	7.67
East	0.09	6.12	0.12	~1	A	56.89	85.34	7.80	5.48	0.09	7.80	5.48

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	465.26	116.32	462.46	570.91	33.67	0.00	1202.22	1148.47	0.387	0.00	0.70	5.438	A
West	124.97	31.24	124.39	119.72	376.41	0.00	1003.85	646.08	0.124	0.00	0.15	4.235	A
South	487.10	121.77	483.93	367.47	133.33	0.00	1144.54	880.77	0.426	0.00	0.79	5.851	A
East	46.68	11.67	46.43	59.11	558.15	0.00	898.67	452.32	0.052	0.00	0.06	4.871	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	555.57	138.89	554.54	684.50	40.37	0.00	1198.34	1148.47	0.464	0.70	0.96	6.261	A
West	149.23	37.31	149.06	143.56	451.36	0.00	960.47	646.08	0.155	0.15	0.19	4.592	A

South	581.64	145.41	580.29	440.61	159.80	0.00	1129.21	880.77	0.515	0.79	1.13	7.058	A
East	55.74	13.93	55.66	70.88	669.21	0.00	834.39	452.32	0.067	0.06	0.08	5.332	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	680.43	170.11	678.42	837.00	49.36	0.00	1193.13	1148.47	0.570	0.96	1.46	7.814	A
West	182.77	45.69	182.48	175.59	552.19	0.00	902.12	646.09	0.203	0.19	0.26	5.176	A
South	712.36	178.09	709.33	539.08	195.60	0.00	1108.50	880.77	0.643	1.13	1.89	9.657	A
East	68.26	17.07	68.13	86.69	818.24	0.00	748.14	452.32	0.091	0.08	0.11	6.104	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	680.43	170.11	680.37	839.97	49.54	0.00	1193.03	1148.47	0.570	1.46	1.47	7.874	A
West	182.77	45.69	182.76	176.15	553.77	0.00	901.20	646.09	0.203	0.26	0.26	5.187	A
South	712.36	178.09	712.25	540.56	195.97	0.00	1108.28	880.77	0.643	1.89	1.91	9.800	A
East	68.26	17.07	68.26	86.97	821.25	0.00	746.39	452.32	0.091	0.11	0.12	6.122	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	555.57	138.89	557.54	688.96	40.63	0.00	1198.18	1148.47	0.464	1.47	0.98	6.321	A
West	149.23	37.31	149.51	144.40	453.78	0.00	959.07	646.08	0.156	0.26	0.19	4.605	A
South	581.64	145.41	584.63	442.89	160.40	0.00	1128.87	880.77	0.515	1.91	1.16	7.177	A
East	55.74	13.93	55.87	71.30	673.72	0.00	831.78	452.32	0.067	0.12	0.08	5.352	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	465.26	116.32	466.33	575.92	33.97	0.00	1202.04	1148.47	0.387	0.98	0.72	5.496	A
West	124.97	31.24	125.15	120.75	379.55	0.00	1002.03	646.08	0.125	0.19	0.15	4.251	A
South	487.10	121.77	488.52	370.47	134.23	0.00	1144.01	880.77	0.426	1.16	0.81	5.939	A
East	46.68	11.67	46.76	59.62	563.13	0.00	895.79	452.32	0.052	0.08	0.06	4.892	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.15	0.68	5.438	A	A
West	2.15	0.14	4.235	A	A
South	11.40	0.76	5.851	A	A
East	0.92	0.06	4.871	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.96	0.93	6.261	A	A
West	2.79	0.19	4.592	A	A
South	16.36	1.09	7.058	A	A
East	1.21	0.08	5.332	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.02	1.40	7.814	A	A
West	3.84	0.26	5.176	A	A
South	26.76	1.78	9.657	A	A

East	1.69	0.11	6.104	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	22.03	1.47	7.874	A	A
West	3.93	0.26	5.187	A	A
South	28.53	1.90	9.800	A	A
East	1.73	0.12	6.122	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.24	1.02	6.321	A	A
West	2.93	0.20	4.605	A	A
South	18.22	1.21	7.177	A	A
East	1.28	0.09	5.352	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.01	0.73	5.496	A	A
West	2.26	0.15	4.251	A	A
South	12.50	0.83	5.939	A	A
East	0.97	0.06	4.892	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.70	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.96	0.00	0.00	0.00	1.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.13	0.00	0.00	1.08	2.16			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.46	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.89	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.47	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.91	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.98	0.00	0.00	0.00	1.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.16	0.00	0.00	1.08	2.16			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.72	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.81	0.00	0.00	1.08	1.08			N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:58:55 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - TT 2036 (PH2)						
Leg North	2.71	6.18	11.51	0.73	B	9.30	A
Leg West	0.26	~1	5.87	0.20	A		
Leg South	1.35	1.05	7.60	0.56	A		
Leg East	0.11	~1	5.69	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
"D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
"D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
"D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
"D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
"D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
"D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
"D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:58:54 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - TT 2036 (PH2), PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2036 (PH2), PM	TT 2036 (PH2)	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				9.30	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	785.00	100.000
West	ONE HOUR	✓	148.00	100.000
South	ONE HOUR	✓	584.00	100.000
East	ONE HOUR	✓	65.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	134.000	614.000	37.000
	West	86.000	0.000	58.000	4.000
	South	494.000	47.000	0.000	43.000
	East	55.000	0.000	10.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.17	0.78	0.05
	West	0.58	0.00	0.39	0.03
	South	0.85	0.08	0.00	0.07
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.73	11.51	2.71	6.18	B	720.33	1080.49	152.43	8.46	1.69	152.46	8.47
West	0.20	5.87	0.26	~1	A	135.81	203.71	17.61	5.19	0.20	17.61	5.19
South	0.56	7.60	1.35	1.05	A	535.89	803.83	84.71	6.32	0.94	84.72	6.32
East	0.09	5.69	0.11	~1	A	59.65	89.47	7.75	5.20	0.09	7.75	5.20

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	590.99	147.75	587.03	475.39	42.67	0.00	1197.00	1133.03	0.494	0.00	0.99	6.037	A
West	111.42	27.86	110.86	135.39	494.31	0.00	935.61	634.28	0.119	0.00	0.14	4.534	A
South	439.67	109.92	437.14	510.09	95.09	0.00	1166.67	967.56	0.377	0.00	0.63	5.173	A
East	48.94	12.23	48.68	62.85	469.38	0.00	950.04	489.64	0.052	0.00	0.06	4.735	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	705.70	176.42	703.80	569.89	51.15	0.00	1192.09	1133.03	0.592	0.99	1.46	7.558	A
West	133.05	33.26	132.87	162.32	592.64	0.00	878.70	634.28	0.151	0.14	0.18	5.016	A

South	525.00	131.25	524.06	611.54	113.97	0.00	1155.74	967.56	0.454	0.63	0.87	5.986	A
East	58.43	14.61	58.36	75.35	562.69	0.00	896.04	489.64	0.065	0.06	0.08	5.096	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	864.30	216.08	859.55	697.28	62.59	0.00	1185.48	1133.04	0.729	1.46	2.65	11.203	B
West	162.95	40.74	162.64	198.32	723.81	0.00	802.79	634.29	0.203	0.18	0.26	5.843	A
South	643.00	160.75	641.12	747.04	139.42	0.00	1141.01	967.56	0.564	0.87	1.33	7.546	A
East	71.57	17.89	71.45	92.12	688.42	0.00	823.27	489.64	0.087	0.08	0.11	5.679	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	864.30	216.08	864.08	699.10	62.75	0.00	1185.38	1133.04	0.729	2.65	2.71	11.511	B
West	162.95	40.74	162.94	199.24	727.59	0.00	800.60	634.29	0.204	0.26	0.26	5.868	A
South	643.00	160.75	642.95	750.72	139.81	0.00	1140.78	967.56	0.564	1.33	1.35	7.603	A
East	71.57	17.89	71.56	92.47	690.29	0.00	822.19	489.64	0.087	0.11	0.11	5.687	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	705.70	176.42	710.44	572.68	51.41	0.00	1191.95	1133.03	0.592	2.71	1.52	7.769	A
West	133.05	33.26	133.36	163.67	598.17	0.00	875.50	634.28	0.152	0.26	0.19	5.046	A
South	525.00	131.25	526.84	616.95	114.58	0.00	1155.39	967.56	0.454	1.35	0.89	6.041	A
East	58.43	14.61	58.55	75.88	565.54	0.00	894.39	489.64	0.065	0.11	0.08	5.110	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	590.99	147.75	593.02	479.06	43.00	0.00	1196.81	1133.03	0.494	1.52	1.02	6.157	A
West	111.42	27.86	111.60	136.69	499.33	0.00	932.71	634.28	0.119	0.19	0.14	4.558	A
South	439.67	109.92	440.64	515.11	95.82	0.00	1166.24	967.56	0.377	0.89	0.64	5.227	A
East	48.94	12.23	49.01	63.41	473.05	0.00	947.92	489.64	0.052	0.08	0.06	4.749	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.23	0.95	6.037	A	A
West	2.05	0.14	4.534	A	A
South	9.14	0.61	5.173	A	A
East	0.94	0.06	4.735	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.09	1.41	7.558	A	A
West	2.72	0.18	5.016	A	A
South	12.63	0.84	5.986	A	A
East	1.21	0.08	5.096	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	36.97	2.46	11.203	B	B
West	3.85	0.26	5.843	A	A
South	19.21	1.28	7.546	A	A

East	1.65	0.11	5.679	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	40.30	2.69	11.511	B	B
West	3.96	0.26	5.868	A	A
South	20.11	1.34	7.603	A	A
East	1.69	0.11	5.687	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	24.04	1.60	7.769	A	A
West	2.87	0.19	5.046	A	A
South	13.74	0.92	6.041	A	A
East	1.27	0.08	5.110	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	15.79	1.05	6.157	A	A
West	2.16	0.14	4.558	A	A
South	9.88	0.66	5.227	A	A
East	0.99	0.07	4.749	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.99	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.63	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.46	0.00	0.00	2.06	4.12			N/A	N/A
West	0.18	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.87	0.00	0.00	0.00	1.05			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.65	0.00	0.00	0.00	6.18			N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.33	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

						very big.			

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.71	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.35	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.52	0.00	0.00	3.09	4.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.89	0.00	0.00	0.00	1.05			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.02	0.00	0.00	1.03	2.06			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.64	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2036 AM PH3.syn

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	↖	→	↗	↘	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↗	↖	↖	↖↗		↖	↖		↖	↖	↖
Traffic Volume (vph)	5	634	642	183	567	3	699	4	233	3	5	13
Future Volume (vph)	5	634	642	183	567	3	699	4	233	3	5	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.889	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1388	0
Flt Permitted	0.369			0.145			0.745			0.558		
Satd. Flow (perm)	646	3167	1340	223	3105	0	1229	1395	0	976	1388	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			698					253			14	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	5	689	698	199	619	3	760	4	253	3	5	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	5	689	698	199	619	0	760	257	0	3	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH3)
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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	↖	→	↗	↘	↙	↘	↙	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.02	0.95	0.83	1.06	0.59		1.08	0.28		0.01	0.02	
Control Delay	24.4	65.6	12.5	113.1	34.3		81.6	2.3		10.3	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.4	65.6	12.5	113.1	34.3		81.6	2.3		10.3	5.8	
LOS	C	E	B	F	C		F	A		B	A	
Approach Delay		38.8			53.5			61.6			6.4	
Approach LOS		D			D			E			A	
Queue Length 50th (m)	0.8	83.2	0.0	-35.9	60.4		-197.0	0.4		0.3	0.5	
Queue Length 95th (m)	3.5	#121.1	#51.0	#84.3	90.1		#271.6	11.4		1.6	3.8	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	222	729	845	188	1050		706	909		561	803	
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	0.02	0.95	0.83	1.06	0.59		1.08	0.28		0.01	0.02	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 49.4

Intersection LOS: D

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH3)
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1: Highway 140 & Regional Road 27

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ICU Level of Service F

Analysis Period (min) 15

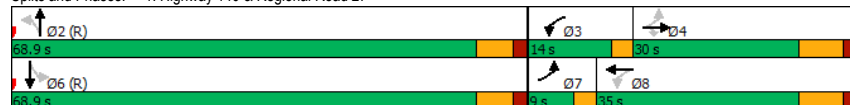
- ~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



1: Highway 140 & Regional Road 27

11-08-2024



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	634	642	183	567	3	699	4	233	3	5	13
Future Volume (vph)	5	634	642	183	567	3	699	4	233	3	5	13
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.89	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1388	
Flt Permitted	0.37	1.00	1.00	0.15	1.00		0.75	1.00		0.56	1.00	
Satd. Flow (perm)	646	3167	1340	223	3106		1229	1395		976	1388	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	689	698	199	616	3	760	4	253	3	5	14
RTOR Reduction (vph)	0	0	522	0	0	0	0	113	0	0	6	0
Lane Group Flow (vph)	5	689	176	199	619	0	760	144	0	3	13	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	796	337	183	1050		680	772		540	768	
v/s Ratio Prot	0.00	0.22		0.10	0.20			0.10			0.01	
v/s Ratio Perm	0.01		0.13	0.26			0.62			0.00		
v/c Ratio	0.04	0.87	0.52	1.09	0.59		1.12	0.19		0.01	0.02	
Uniform Delay, d1	35.9	40.4	36.4	32.6	30.9		25.2	12.5		11.3	11.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	12.1	5.7	91.8	2.4		71.5	0.5		0.0	0.0	
Delay (s)	36.1	52.6	42.1	124.4	33.3		96.7	13.1		11.3	11.4	
Level of Service	D	D	D	F	C		F	B		B	B	
Approach Delay (s)		47.2			55.5			75.6			11.4	
Approach LOS		D			E			E			B	

Intersection Summary

HCM 2000 Control Delay	57.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	112.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2036 AM PH3.syn
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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	6	1	1	3	0	9	4	736	4	1	440	4
Future Volume (vph)	6	1	1	3	0	9	4	736	4	1	440	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0			1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.985			0.896				0.850			0.850
Flt Protected		0.963			0.989							
Satd. Flow (prot)	0	1321	0	0	1551	0	0	1606	1488	0	1563	1488
Flt Permitted		0.963			0.989							
Satd. Flow (perm)	0	1321	0	0	1551	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			1318.9
Travel Time (s)		83.0			10.0				123.3			95.0
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	7	1	1	3	0	10	4	800	4	1	478	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	9	0	0	13	0	0	804	4	0	479	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.0%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	6	1	1	3	0	9	4	736	4	1	440	4
Future Volume (Veh/h)	6	1	1	3	0	9	4	736	4	1	440	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	7	1	1	3	0	10	4	800	4	1	478	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1298	1292	478	1290	1292	800	482			804		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1298	1292	478	1290	1292	800	482			804		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	99	100	98	100	97	100			100		
cM capacity (veh/h)	116	164	591	140	164	388	1091			829		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	9	13	804	4	479	4						
Volume Left	7	3	4	0	1	0						
Volume Right	1	10	0	4	0	4						
cSH	132	276	1091	1700	829	1700						
Volume to Capacity	0.07	0.05	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	1.7	1.2	0.1	0.0	0.0	0.0						
Control Delay (s)	34.2	18.7	0.1	0.0	0.0	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	34.2	18.7	0.1		0.0							
Approach LOS	D	C										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			59.0%				ICU Level of Service			B		
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2036 AM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	5	10	0	3	3	730	3	1	444	0
Future Volume (vph)	1	0	5	10	0	3	3	730	3	1	444	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.887			0.971				0.850			
Flt Protected		0.992			0.962							
Satd. Flow (prot)	0	1540	0	0	1577	0	0	1606	1118	0	1560	1750
Flt Permitted		0.992			0.962							
Satd. Flow (perm)	0	1540	0	0	1577	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	5	11	0	3	3	793	3	1	483	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	14	0	0	796	3	0	484	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	54.3%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2036 AM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	5	10	0	3	3	730	3	1	444	0
Future Volume (Veh/h)	1	0	5	10	0	3	3	730	3	1	444	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	5	11	0	3	3	793	3	1	483	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1287	1287	483	1289	1284	793	483			796		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1287	1287	483	1289	1284	793	483			796		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	92	100	99	100			100		
cM capacity (veh/h)	141	165	588	140	166	366	1090			519		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	6	14	796	3	484	0						
Volume Left	1	11	3	0	1	0						
Volume Right	5	3	0	3	0	0						
cSH	384	162	1090	1700	519	1700						
Volume to Capacity	0.02	0.09	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	0.4	2.2	0.1	0.0	0.0	0.0						
Control Delay (s)	14.5	29.4	0.1	0.0	0.1	0.0						
Lane LOS	B	D	A		A							
Approach Delay (s)	14.5	29.4	0.1		0.1							
Approach LOS	B	D										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			54.3%				ICU Level of Service			A		
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 AM PH3.syn
11-08-2024

	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔	
Traffic Volume (vph)	19	8	0	33	11	24	4	690	30	34	404	24	
Future Volume (vph)	19	8	0	33	11	24	4	690	30	34	404	24	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (m)	7.5			7.5			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					0.953				0.850			0.850	
Flt Protected	0.966				0.976		0.950			0.950			
Satd. Flow (prot)	0	1294	0	0	1274	0	1662	1636	1305	1087	1606	1118	
Flt Permitted	0.814				0.835		0.488			0.312			
Satd. Flow (perm)	0	1091	0	0	1090	0	854	1636	1305	357	1606	1118	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)					26				39			39	
Link Speed (k/h)	50				50				50			50	
Link Distance (m)	388.1				2359.9				455.1			2151.0	
Travel Time (s)	27.9				169.9				32.8			154.9	
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%	
Adj. Flow (vph)	21	9	0	36	12	26	4	750	33	37	439	26	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	30	0	0	74	0	4	750	33	37	439	26	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(m)	0.0				0.0				3.6			3.6	
Link Offset(m)	0.0				0.0				0.0			0.0	
Crosswalk Width(m)	4.8				4.8				4.8			4.8	
Two way Left Turn Lane													
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	
Turning Speed (k/h)	25		15	25		15	25		15	25		15	
Number of Detectors	1	2		1	2		1	2	1	1	2	1	
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0	
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4		
Detector 2 Size(m)		0.6			0.6			0.6			0.6		
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm	
Protected Phases		4			8			2			6		

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH3)
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 AM PH3.syn
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	↖	→	↘	↙	←	↖	↗	↘	↙	↖	↗	↘	↙
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Permitted Phases	4			8			2		2	6		6	
Detector Phase	4	4		8	8		2	2	2	6	6	6	
Switch Phase													
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0	
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0	
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0	
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%	
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag													
Lead-Lag Optimize?													
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5	
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max	
Walk Time (s)	11.0	11.0											
Flash Dont Walk (s)				7.0	7.0								
Pedestrian Calls (#/hr)				0	0								
Act Effect Green (s)		12.6			12.6		51.9	51.9	51.9	51.9	51.9	51.9	
Actuated g/C Ratio		0.18			0.18		0.76	0.76	0.76	0.76	0.76	0.76	
v/c Ratio		0.15			0.33		0.01	0.60	0.03	0.14	0.36	0.03	
Control Delay		25.5			22.0		3.5	8.0	1.3	5.1	5.0	1.0	
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		25.5			22.0		3.5	8.0	1.3	5.1	5.0	1.0	
LOS		C			C		A	A	A	A	A	A	
Approach Delay		25.5			22.0			7.7			4.8		
Approach LOS		C			C			A			A		
Queue Length 50th (m)		3.4			5.6		0.2	43.3	0.0	1.3	18.9	0.0	
Queue Length 95th (m)		10.3			16.8		0.9	87.7	2.0	5.0	37.5	1.5	
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0		
Turn Bay Length (m)							110.0		190.0	55.0		15.0	
Base Capacity (vph)		431			446		648	1241	1000	271	1219	858	
Starvation Cap Reductn		0			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.07			0.17		0.01	0.60	0.03	0.14	0.36	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 83
Actuated Cycle Length: 68.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 7.8
Intersection Capacity Utilization 54.4%
Analysis Period (min) 15

Intersection LOS: A
ICU Level of Service A

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2036 PH3)
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Splits and Phases: 6: Highway 140 & Concession 2 Road

11-08-2024

Upstream: Highway 140 & Connection 2 Road		Downstream: Highway 140 & Connection 2 Road	
			
			

11-08-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	8	0	33	11	24	4	690	30	34	404	24
Future Volume (vph)	19	8	0	33	11	24	4	690	30	34	404	24
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1295			1274		1662	1636	1305	1087	1606	1118
Flt Permitted		0.81			0.83		0.49	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)		1090			1089		855	1636	1305	357	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	9	0	36	12	26	4	750	33	37	439	26
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	9	0	0	7
Lane Group Flow (vph)	0	30	0	0	52	0	4	750	24	37	439	19
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.5			8.5		48.1	48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.5			10.5		51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15		0.73	0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		164			164		627	1201	958	262	1179	820
v/s Ratio Prot								c0.46			0.27	
v/s Ratio Perm		0.03			c0.05		0.00		0.02	0.10		0.02
v/c Ratio		0.18			0.32		0.01	0.62	0.03	0.14	0.37	0.02
Uniform Delay, d1		25.8			26.4		2.5	4.5	2.5	2.7	3.4	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.1		0.0	2.5	0.0	1.1	0.9	0.1
Delay (s)		26.3			27.5		2.5	7.0	2.6	3.9	4.3	2.6
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.3			27.5			6.8			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.4		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			69.6		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			54.4%		ICU Level of Service				A			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2036 AM PH3.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	51	54	138	605	404	108
Future Volume (vph)	51	54	138	605	404	108
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.930				0.972	
Flt Protected	0.976			0.991		
Satd. Flow (prot)	1271	0	0	1560	1483	0
Flt Permitted	0.976			0.991		
Satd. Flow (perm)	1271	0	0	1560	1483	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	55	59	150	658	439	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	0	808	556	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 89.7%	ICU Level of Service E
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2036 AM PH3.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	51	54	138	605	404	108
Future Volume (Veh/h)	51	54	138	605	404	108
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	59	150	658	439	117
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1456	498	556			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1456	498	556			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	48	89	84			
cM capacity (veh/h)	106	529	909			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	114	808	556
Volume Left	55	150	0
Volume Right	59	0	117
cSH	181	909	1700
Volume to Capacity	0.63	0.16	0.33
Queue Length 95th (m)	28.6	4.7	0.0
Control Delay (s)	53.7	3.9	0.0
Lane LOS	F	A	
Approach Delay (s)	53.7	3.9	0.0
Approach LOS	F		

Intersection Summary

Average Delay	6.3
Intersection Capacity Utilization 89.7%	ICU Level of Service E
Analysis Period (min)	15

1: Highway 140 & Regional Road 27

TT 2036 PM PH3.syn

11-08-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	723	730	246	824	5	708	4	227	0	3	20
Future Volume (vph)	14	723	730	246	824	5	708	4	227	0	3	20
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.868	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3164	0	1583	1375	0	1750	1403	0
Flt Permitted	0.196			0.139			0.741					
Satd. Flow (perm)	327	3197	1430	236	3164	0	1234	1375	0	1750	1403	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			793		1			228			22	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			3375.6			350.8	
Travel Time (s)		80.9			139.5			243.0			25.3	
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	15	786	793	267	896	5	770	4	247	0	3	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	15	786	793	267	901	0	770	251	0	0	25	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2036 PH3)
PTSL (200364)

Synchro 11 Report
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1: Highway 140 & Regional Road 27

TT 2036 PM PH3.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA				
Protected Phases	7	4		3	8			2			6				
Permitted Phases	4		4	8			2			6					
Detector Phase	7	4	4	3	8		2	2		6	6				
Switch Phase															
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0				
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0				
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9				
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%				
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9				
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0				
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0				
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0				
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0				
Lead/Lag	Lead	Lag	Lag	Lead	Lag										
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes										
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0				
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max				
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0				
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0				
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0				
Act Effct Green (s)	41.0	36.0	36.0	49.0	45.4		55.9	55.9			55.9				
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.40		0.50	0.50			0.50				
v/c Ratio	0.09	0.77	0.80	1.26	0.71		1.26	0.32			0.04				
Control Delay	19.7	40.8	9.2	173.7	32.8		158.6	4.0			6.6				
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0				
Total Delay	19.7	40.8	9.2	173.7	32.8		158.6	4.0			6.6				
LOS	B	D	A	F	C		F	A			A				
Approach Delay		24.9			65.0			120.6			6.6				
Approach LOS		C			E			F			A				
Queue Length 50th (m)	1.9	86.4	0.0	~57.4	85.2		~224.9	2.7			0.4				
Queue Length 95th (m)	6.1	110.5	42.6	#111.6	124.9		#300.0	16.3			4.9				
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8				
Turn Bay Length (m)	130.0		100.0	180.0			300.0								
Base Capacity (vph)	174	1019	996	212	1272		610	795			705				
Starvation Cap Reductn	0	0	0	0	0		0	0			0				
Spillback Cap Reductn	0	0	0	0	0		0	0			0				
Storage Cap Reductn	0	0	0	0	0		0	0			0				
Reduced v/c Ratio	0.09	0.77	0.80	1.26	0.71		1.26	0.32			0.04				

Intersection Summary

Area Type:	Other
Cycle Length:	112.9
Actuated Cycle Length:	112.9
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	130
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	1.26
Intersection Signal Delay:	62.7

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2036 PH3)
PTSL (200364)

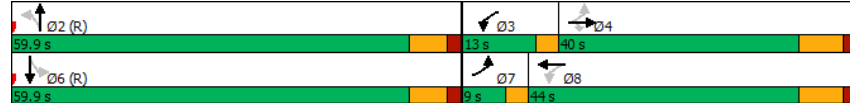
Synchro 11 Report
Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2036 PM PH3.syn
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Intersection Capacity Utilization 103.9%	ICU Level of Service G
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

TT 2036 PM PH3.syn
11-08-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↗	↘	↙	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖	↖	↖	↖	↖	↖			
Traffic Volume (vph)	14	723	730	246	824	5	708	4	227	0	3	20			
Future Volume (vph)	14	723	730	246	824	5	708	4	227	0	3	20			
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750			
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00			
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99			
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00			
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.87			
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00			
Satd. Flow (prot)	1583	3197	1430	1614	3165		1582	1375				1403			
Flt Permitted	0.20	1.00	1.00	0.14	1.00		0.74	1.00				1.00			
Satd. Flow (perm)	326	3197	1430	236	3165		1234	1375				1403			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Adj. Flow (vph)	15	786	793	267	896	5	770	4	247	0	3	22			
RTOR Reduction (vph)	0	0	527	0	1	0	0	119	0	0	11	0			
Lane Group Flow (vph)	15	786	266	267	900	0	770	132	0	0	14	0			
Confl. Peds. (#/hr)							1		3	3		1			
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%			
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA				
Protected Phases	7	4		3	8			2			6				
Permitted Phases	4		4	8			2			6					
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1				
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1				
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48				
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0				
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0				
Lane Grp Cap (vph)	114	1070	478	205	1272		591	658			672				
v/s Ratio Prot	0.00	0.25		c0.10	0.28			0.10			0.01				
v/s Ratio Perm	0.04		0.19	c0.42			c0.62								
v/c Ratio	0.13	0.73	0.56	1.30	0.71		1.30	0.20			0.02				
Uniform Delay, d1	28.3	33.1	30.7	27.7	28.2		29.4	16.9			15.5				
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00				
Incremental Delay, d2	0.7	4.5	4.6	166.9	3.3		148.3	0.7			0.1				
Delay (s)	29.1	37.6	35.3	194.7	31.6		177.7	17.6			15.5				
Level of Service	C	D	D	F	C		F	B			B				
Approach Delay (s)		36.4			68.8			138.4			15.5				
Approach LOS		D			E			F			B				
Intersection Summary															
HCM 2000 Control Delay		73.5													
HCM 2000 Volume to Capacity ratio		1.27													
Actuated Cycle Length (s)		112.9								12.0					
Intersection Capacity Utilization		103.9%									G				
Analysis Period (min)		15													
c Critical Lane Group															

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2036 PM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	9	0	8	9	4	6	6	585	8	5	685	9
Future Volume (vph)	9	0	8	9	4	6	6	585	8	5	685	9
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.936			0.955				0.850			0.850
Flt Protected		0.974			0.977			0.999				
Satd. Flow (prot)	0	1595	0	0	1633	0	0	1682	1488	0	1697	1488
Flt Permitted		0.974			0.977			0.999				
Satd. Flow (perm)	0	1595	0	0	1633	0	0	1682	1488	0	1697	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			1313.7	
Travel Time (s)		83.0			10.0			123.3			94.6	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	10	0	9	10	4	7	7	636	9	5	745	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	19	0	0	21	0	0	643	9	0	750	10
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 56.1%
Analysis Period (min) 15

ICU Level of Service B

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2036 PM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	9	0	8	9	4	6	6	585	8	5	685	9
Future Volume (Veh/h)	9	0	8	9	4	6	6	585	8	5	685	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	10	0	9	10	4	7	7	636	9	5	745	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1414	1414	745	1414	1415	636	755			645		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1414	1414	745	1414	1415	636	755			645		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	91	100	98	91	97	99	99			99		
cM capacity (veh/h)	111	137	417	113	137	481	865			872		

Direction, Lane #

	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	19	21	643	9	750	10
Volume Left	10	10	7	0	5	0
Volume Right	9	7	0	9	0	10
cSH	170	158	865	1700	872	1700
Volume to Capacity	0.11	0.13	0.01	0.01	0.01	0.01
Queue Length 95th (m)	3.0	3.6	0.2	0.0	0.1	0.0
Control Delay (s)	28.8	31.2	0.2	0.0	0.2	0.0
Lane LOS	D	D	A		A	
Approach Delay (s)	28.8	31.2	0.2		0.2	
Approach LOS	D	D				

Intersection Summary

Average Delay 1.0
Intersection Capacity Utilization 56.1% ICU Level of Service B
Analysis Period (min) 15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2036 PM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	4	1	1	3	0	4	4	602	10	6	695	3
Future Volume (vph)	4	1	1	3	0	4	4	602	10	6	695	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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			0.923				0.850			0.850
Flt Protected		0.968			0.979							
Satd. Flow (prot)	0	1655	0	0	1385	0	0	1683	1271	0	1716	1488
Flt Permitted		0.968			0.979							
Satd. Flow (perm)	0	1655	0	0	1385	0	0	1683	1271	0	1716	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	4	1	1	3	0	4	4	654	11	7	755	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	7	0	0	658	11	0	762	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 56.7%

ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2036 PM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	4	1	1	3	0	4	4	602	10	6	695	3
Future Volume (Veh/h)	4	1	1	3	0	4	4	602	10	6	695	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	1	1	3	0	4	4	654	11	7	755	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1435	1442	755	1432	1434	654	758			665		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1435	1442	755	1432	1434	654	758			665		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	96	99	100	97	100	99	100			99		
cM capacity (veh/h)	111	132	412	94	133	470	862			934		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	7	658	11	762	3
Volume Left	4	3	4	0	7	0
Volume Right	1	4	0	11	0	3
cSH	130	173	862	1700	934	1700
Volume to Capacity	0.05	0.04	0.00	0.01	0.01	0.00
Queue Length 95th (m)	1.2	1.0	0.1	0.0	0.2	0.0
Control Delay (s)	34.0	26.7	0.1	0.0	0.2	0.0
Lane LOS	D	D	A		A	
Approach Delay (s)	34.0	26.7	0.1		0.2	
Approach LOS	D	D				

Intersection Summary

Average Delay 0.4
Intersection Capacity Utilization 56.7% ICU Level of Service B
Analysis Period (min) 15

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 PM PH3.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	27	8	5	63	13	19	0	568	53	24	643	29
Future Volume (vph)	27	8	5	63	13	19	0	568	53	24	643	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt	0.984				0.972				0.850			0.850
Flt Protected	0.967				0.968				0.950			
Satd. Flow (prot)	0	1502	0	0	1607	0	1716	1681	1400	1395	1709	1458
Flt Permitted	0.806				0.775				0.381			
Satd. Flow (perm)	0	1250	0	0	1287	0	1716	1681	1400	560	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			16				58			39
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		388.1			2359.9			455.1			2151.0	
Travel Time (s)		27.9			169.9			32.8			154.9	
Confl. Peds. (#/hr)	1					1						
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	29	9	5	68	14	21	0	617	58	26	699	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	43	0	0	103	0	0	617	58	26	699	32
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2036 PH3)
PTSL (200364)

Synchro 11 Report
Page 9

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 PM PH3.syn
11-08-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			2	6	
Detector Phase	4	4		8	8		2	2		2	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0		22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0		52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%		62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0		45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0		-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max		Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		13.2			13.2			51.9		51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19			0.75		0.75	0.75	0.75
v/c Ratio		0.18			0.40			0.49		0.05	0.06	0.54
Control Delay		23.1			25.9			6.6		1.4	4.3	7.3
Queue Delay		0.0			0.0			0.0		0.0	0.0	0.0
Total Delay		23.1			25.9			6.6		1.4	4.3	7.3
LOS		C			C			A		A	A	A
Approach Delay		23.1			25.9			6.2			7.0	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		4.4			10.4			30.4		0.0	0.9	36.9
Queue Length 95th (m)		12.3			23.8			65.1		3.2	3.7	79.2
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)								190.0		55.0		15.0
Base Capacity (vph)		492			513			1265		1068	421	1286
Starvation Cap Reductn		0			0			0		0	0	0
Spillback Cap Reductn		0			0			0		0	0	0
Storage Cap Reductn		0			0			0		0	0	0
Reduced v/c Ratio		0.09			0.20			0.49		0.05	0.06	0.54
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		69										
Natural Cycle:		60										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.54										
Intersection Signal Delay:		8.3						Intersection LOS: A				
Intersection Capacity Utilization		52.0%						ICU Level of Service A				

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2036 PH3)
PTSL (200364)

Synchro 11 Report
Page 10

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2036 PM PH3.syn
11-08-2024

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2036 PM PH3.syn
11-08-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	8	5	63	13	19	0	568	53	24	643	29
Future Volume (vph)	27	8	5	63	13	19	0	568	53	24	643	29
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1501			1608			1681	1400	1395	1709	1458
Flt Permitted		0.81			0.77			1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)		1251			1287			1681	1400	559	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	9	5	68	14	21	0	617	58	26	699	32
RTOR Reduction (vph)	0	4	0	0	13	0	0	0	16	0	0	9
Lane Group Flow (vph)	0	39	0	0	90	0	0	617	42	26	699	23
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.1			9.1			48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		11.1			11.1			51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.16			0.16			0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		197			203			1223	1019	406	1244	1061
v/s Ratio Prot								0.37			c0.41	
v/s Ratio Perm		0.03			c0.07				0.03	0.05		0.02
v/c Ratio		0.20			0.44			0.50	0.04	0.06	0.56	0.02
Uniform Delay, d1		25.7			26.7			4.1	2.7	2.7	4.4	2.6
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.5			1.5	0.1	0.3	1.8	0.0
Delay (s)		26.2			28.3			5.6	2.8	3.0	6.2	2.7
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.2			28.3			5.4			6.0	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.7			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.54										
Actuated Cycle Length (s)		70.2			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		52.0%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2036 PM PH3.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	←	→	←	↑	↑	→
Traffic Volume (vph)	101	155	71	497	635	57
Future Volume (vph)	101	155	71	497	635	57
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.918				0.989	
Flt Protected	0.981			0.994		
Satd. Flow (prot)	1261	0	0	1631	1666	0
Flt Permitted	0.981			0.994		
Satd. Flow (perm)	1261	0	0	1631	1666	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	110	168	77	540	690	62
Shared Lane Traffic (%)						
Lane Group Flow (vph)	278	0	0	617	752	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 99.1%	ICU Level of Service F
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2036 PM PH3.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	←	→	←	↑	↑	→
Traffic Volume (veh/h)	101	155	71	497	635	57
Future Volume (Veh/h)	101	155	71	497	635	57
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	110	168	77	540	690	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1415	721	752			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1415	721	752			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	9	57	90			
cM capacity (veh/h)	121	391	763			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	278	617	752
Volume Left	110	77	0
Volume Right	168	0	62
cSH	208	763	1700
Volume to Capacity	1.34	0.10	0.44
Queue Length 95th (m)	123.9	2.7	0.0
Control Delay (s)	225.2	2.6	0.0
Lane LOS	F	A	
Approach Delay (s)	225.2	2.6	0.0
Approach LOS	F		

Intersection Summary

Average Delay	39.0
Intersection Capacity Utilization	99.1%
Analysis Period (min)	15
ICU Level of Service	F

Junctions 8
ARCADY 8 - Roundabout Module
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Report generation date: 2024-11-07 12:59:17 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - TT 2036 (PH3)						
Leg North	1.59	1.12	8.22	0.59	A	8.59	A
Leg West	0.27	~1	5.28	0.21	A		
Leg South	1.98	2.16	10.02	0.65	B		
Leg East	0.12	~1	6.17	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:59:16 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - TT 2036 (PH3), AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2036 (PH3), AM	TT 2036 (PH3)	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				8.59	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	638.00	100.000
West	ONE HOUR	✓	166.00	100.000
South	ONE HOUR	✓	655.00	100.000
East	ONE HOUR	✓	62.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

		To			
From		North	West	South	East
	North	0.000	126.000	461.000	51.000
	West	124.000	0.000	39.000	3.000
	South	596.000	34.000	0.000	25.000
	East	51.000	0.000	11.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.20	0.72	0.08
	West	0.75	0.00	0.23	0.02
	South	0.91	0.05	0.00	0.04
	East	0.82	0.00	0.18	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.59	8.22	1.59	1.12	A	585.44	878.16	99.60	6.80	1.11	99.61	6.81
West	0.21	5.28	0.27	~1	A	152.32	228.49	18.16	4.77	0.20	18.16	4.77
South	0.65	10.02	1.98	2.16	B	601.04	901.56	117.03	7.79	1.30	117.04	7.79
East	0.09	6.17	0.12	~1	A	56.89	85.34	7.85	5.52	0.09	7.85	5.52

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	480.32	120.08	477.37	576.86	33.67	0.00	1202.22	1148.72	0.400	0.00	0.74	5.547	A
West	124.97	31.24	124.38	119.71	391.33	0.00	995.22	641.76	0.126	0.00	0.15	4.277	A
South	493.12	123.28	489.89	382.39	133.32	0.00	1144.54	884.39	0.431	0.00	0.81	5.905	A
East	46.68	11.67	46.42	59.11	564.10	0.00	895.22	451.94	0.052	0.00	0.06	4.891	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	573.55	143.39	572.44	691.65	40.37	0.00	1198.34	1148.72	0.479	0.74	1.02	6.437	A
West	149.23	37.31	149.06	143.54	469.26	0.00	950.11	641.76	0.157	0.15	0.19	4.651	A

South	588.83	147.21	587.43	458.52	159.80	0.00	1129.22	884.39	0.521	0.81	1.16	7.149	A
East	55.74	13.93	55.66	70.87	676.35	0.00	830.25	451.94	0.067	0.06	0.08	5.360	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	702.45	175.61	700.23	845.67	49.36	0.00	1193.13	1148.73	0.589	1.02	1.57	8.152	A
West	182.77	45.69	182.47	175.56	574.03	0.00	889.48	641.76	0.205	0.19	0.27	5.269	A
South	721.17	180.29	718.00	560.92	195.58	0.00	1108.51	884.39	0.651	1.16	1.95	9.863	A
East	68.26	17.07	68.13	86.68	826.90	0.00	743.12	451.94	0.092	0.08	0.12	6.150	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	702.45	175.61	702.39	848.77	49.54	0.00	1193.03	1148.73	0.589	1.57	1.59	8.224	A
West	182.77	45.69	182.76	176.14	575.78	0.00	888.48	641.76	0.206	0.27	0.27	5.281	A
South	721.17	180.29	721.05	562.57	195.97	0.00	1108.28	884.39	0.651	1.95	1.98	10.022	B
East	68.26	17.07	68.26	86.97	830.05	0.00	741.30	451.94	0.092	0.12	0.12	6.169	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	573.55	143.39	575.73	696.29	40.64	0.00	1198.18	1148.72	0.479	1.59	1.04	6.506	A
West	149.23	37.31	149.52	144.43	471.94	0.00	948.56	641.76	0.157	0.27	0.19	4.665	A
South	588.83	147.21	591.96	461.04	160.41	0.00	1128.86	884.39	0.522	1.98	1.20	7.277	A
East	55.74	13.93	55.87	71.32	681.06	0.00	827.53	451.94	0.067	0.12	0.08	5.381	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	480.32	120.08	481.48	581.99	33.97	0.00	1202.04	1148.72	0.400	1.04	0.75	5.612	A
West	124.97	31.24	125.15	120.76	394.69	0.00	993.27	641.76	0.126	0.19	0.15	4.294	A
South	493.12	123.28	494.59	385.60	134.24	0.00	1144.01	884.39	0.431	1.20	0.83	5.995	A
East	46.68	11.67	46.76	59.63	569.20	0.00	892.27	451.94	0.052	0.08	0.06	4.911	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	10.68	0.71	5.547	A	A
West	2.17	0.14	4.277	A	A
South	11.64	0.78	5.905	A	A
East	0.92	0.06	4.891	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.79	0.99	6.437	A	A
West	2.83	0.19	4.651	A	A
South	16.76	1.12	7.149	A	A
East	1.22	0.08	5.360	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	22.56	1.50	8.152	A	A
West	3.91	0.26	5.269	A	A
South	27.62	1.84	9.863	A	A

East	1.70	0.11	6.150	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	23.73	1.58	8.224	A	A
West	4.00	0.27	5.281	A	A
South	29.51	1.97	10.022	B	B
East	1.74	0.12	6.169	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.22	1.08	6.506	A	A
West	2.97	0.20	4.665	A	A
South	18.71	1.25	7.277	A	A
East	1.28	0.09	5.381	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	11.62	0.77	5.612	A	A
West	2.28	0.15	4.294	A	A
South	12.78	0.85	5.995	A	A
East	0.98	0.07	4.911	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.74	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.81	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.02	0.00	0.00	1.12	1.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.16	0.00	0.00	1.08	2.16			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.57	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.95	0.00	0.00	0.00	2.16			N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

						very big.			

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.59	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.98	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.12	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.04	0.00	0.00	1.12	1.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.20	0.00	0.00	1.08	2.16			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.75	0.00	0.00	0.00	1.12			N/A	N/A
West	0.15	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.83	0.00	0.00	1.08	1.08			N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:59:33 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - TT 2036 (PH3)						
Leg North	2.82	6.18	11.87	0.74	B	9.58	A
Leg West	0.27	~1	5.92	0.21	A		
Leg South	1.42	1.05	7.85	0.58	A		
Leg East	0.11	~1	5.76	0.09	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM

"D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM

"D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM

"D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM

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"D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM

"D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM

"D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM

"D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM

"D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM

"D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM

"D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM

"D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:59:32 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - TT 2036 (PH3), PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2036 (PH3), PM	TT 2036 (PH3)	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				9.58	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	794.00	100.000
West	ONE HOUR	✓	148.00	100.000
South	ONE HOUR	✓	598.00	100.000
East	ONE HOUR	✓	65.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	134.000	623.000	37.000
	West	86.000	0.000	58.000	4.000
	South	508.000	47.000	0.000	43.000
	East	55.000	0.000	10.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.00	0.17	0.78	0.05
	West	0.58	0.00	0.39	0.03
	South	0.85	0.08	0.00	0.07
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
From	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.74	11.87	2.82	6.18	B	728.59	1092.88	157.49	8.65	1.75	157.52	8.65
West	0.21	5.92	0.27	~1	A	135.81	203.71	17.73	5.22	0.20	17.73	5.22
South	0.58	7.85	1.42	1.05	A	548.74	823.10	88.79	6.47	0.99	88.80	6.47
East	0.09	5.76	0.11	~1	A	59.65	89.47	7.83	5.25	0.09	7.83	5.25

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	597.76	149.44	593.71	485.83	42.67	0.00	1197.01	1134.13	0.499	0.00	1.01	6.102	A
West	111.42	27.86	110.86	135.38	501.00	0.00	931.74	632.57	0.120	0.00	0.14	4.556	A
South	450.21	112.55	447.59	516.78	95.08	0.00	1166.67	968.48	0.386	0.00	0.65	5.247	A
East	48.94	12.23	48.68	62.85	479.82	0.00	944.00	488.75	0.052	0.00	0.06	4.767	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	713.79	178.45	711.82	582.42	51.15	0.00	1192.10	1134.13	0.599	1.01	1.51	7.682	A
West	133.05	33.26	132.87	162.30	600.67	0.00	874.06	632.57	0.152	0.14	0.19	5.047	A

South	537.59	134.40	536.59	619.57	113.97	0.00	1155.74	968.48	0.465	0.65	0.90	6.105	A
East	58.43	14.61	58.36	75.35	575.22	0.00	888.79	488.75	0.066	0.06	0.08	5.141	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	874.21	218.55	869.19	712.56	62.58	0.00	1185.48	1134.13	0.737	1.51	2.76	11.531	B
West	162.95	40.74	162.63	198.28	733.49	0.00	797.19	632.57	0.204	0.19	0.26	5.895	A
South	658.41	164.60	656.40	756.72	139.40	0.00	1141.02	968.48	0.577	0.90	1.41	7.781	A
East	71.57	17.89	71.44	92.10	703.70	0.00	814.43	488.75	0.088	0.08	0.11	5.746	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	874.21	218.55	873.96	714.51	62.75	0.00	1185.38	1134.13	0.737	2.76	2.82	11.871	B
West	162.95	40.74	162.94	199.24	737.48	0.00	794.88	632.57	0.205	0.26	0.27	5.921	A
South	658.41	164.60	658.35	760.61	139.81	0.00	1140.78	968.48	0.577	1.41	1.42	7.846	A
East	71.57	17.89	71.56	92.47	705.70	0.00	813.27	488.75	0.088	0.11	0.11	5.755	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	713.79	178.45	718.81	585.40	51.42	0.00	1191.94	1134.13	0.599	2.82	1.57	7.911	A
West	133.05	33.26	133.36	163.72	606.51	0.00	870.68	632.57	0.153	0.27	0.19	5.077	A
South	537.59	134.40	539.57	625.27	114.59	0.00	1155.38	968.48	0.465	1.42	0.93	6.168	A
East	58.43	14.61	58.55	75.90	578.26	0.00	887.03	488.75	0.066	0.11	0.08	5.153	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	597.76	149.44	599.88	489.65	43.01	0.00	1196.81	1134.13	0.499	1.57	1.04	6.230	A
West	111.42	27.86	111.61	136.70	506.18	0.00	928.75	632.57	0.120	0.19	0.14	4.582	A
South	450.21	112.55	451.24	521.96	95.82	0.00	1166.24	968.48	0.386	0.93	0.67	5.303	A
East	48.94	12.23	49.01	63.42	483.65	0.00	941.78	488.75	0.052	0.08	0.07	4.784	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	14.54	0.97	6.102	A	A
West	2.06	0.14	4.556	A	A
South	9.49	0.63	5.247	A	A
East	0.94	0.06	4.767	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	21.66	1.44	7.682	A	A
West	2.73	0.18	5.047	A	A
South	13.17	0.88	6.105	A	A
East	1.22	0.08	5.141	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	38.37	2.56	11.531	B	B
West	3.89	0.26	5.895	A	A
South	20.24	1.35	7.781	A	A

East	1.67	0.11	5.746	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	41.97	2.80	11.871	B	B
West	3.99	0.27	5.921	A	A
South	21.24	1.42	7.846	A	A
East	1.71	0.11	5.755	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	24.77	1.65	7.911	A	A
West	2.89	0.19	5.077	A	A
South	14.38	0.96	6.168	A	A
East	1.29	0.09	5.153	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	16.17	1.08	6.230	A	A
West	2.18	0.15	4.582	A	A
South	10.27	0.68	5.303	A	A
East	1.00	0.07	4.784	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.01	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.65	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.06	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.51	0.00	0.00	3.09	4.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.90	0.00	0.00	1.05	1.05			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.76	0.00	0.00	0.00	6.18			N/A	N/A
West	0.26	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.41	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

						very big.			

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.82	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.27	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.42	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.11	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.57	0.00	0.00	3.09	4.12			N/A	N/A
West	0.19	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.93	0.00	0.00	0.00	1.05			N/A	N/A
East	0.08	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.04	0.00	0.00	1.03	3.09			N/A	N/A
West	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.67	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings

TT 2041 AM PH3.syn

1: Highway 140 & Regional Road 27

11-08-2024

	↖	→	↗	↘	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	6	700	699	201	626	3	767	4	257	3	6	14
Future Volume (vph)	6	700	699	201	626	3	767	4	257	3	6	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.898	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1413	0
Flt Permitted	0.311			0.145			0.743			0.535		
Satd. Flow (perm)	544	3167	1340	223	3105	0	1226	1395	0	936	1413	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			760					279			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	7	761	760	218	683	3	834	4	279	3	7	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	761	760	218	683	0	834	283	0	3	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2041)
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Lanes, Volumes, Timings

TT 2041 AM PH3.syn

1: Highway 140 & Regional Road 27

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	↖	→	↗	↘	←	↖	↗	↘	↙	↘	↙	↘
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9	68.9	
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%	61.0%	
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9	61.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9	64.9	
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57	0.57	
v/c Ratio	0.04	1.04	0.85	1.16	0.65		1.18	0.31		0.01	0.03	
Control Delay	24.5	88.0	13.4	144.9	35.9		122.3	2.3		10.3	6.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.5	88.0	13.4	144.9	35.9		122.3	2.3		10.3	6.0	
LOS	C	F	B	F	D		F	A		B	A	
Approach Delay		50.6			62.3			91.9			6.5	
Approach LOS		D			E			F			A	
Queue Length 50th (m)	1.0	~101.0	0.0	~45.0	68.5		~233.2	0.4		0.3	0.7	
Queue Length 95th (m)	4.4	#140.2	#79.7	#95.6	101.1		#309.7	11.8		1.6	4.2	
Internal Link Dist (m)		1099.3			1913.5			195.0			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	198	729	893	188	1050		704	920		538	818	
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	1.04	0.85	1.16	0.65		1.18	0.31		0.01	0.03	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.18

Intersection Signal Delay: 66.1

Intersection LOS: E

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2041)
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Page 2

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

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Intersection Capacity Utilization 99.1%	ICU Level of Service F
Analysis Period (min) 15	
- Volume exceeds capacity, queue is theoretically infinite.	
Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis
1: Highway 140 & Regional Road 27

TT 2041 AM PH3.syn
11-08-2024

	↖	→	↗	↙	←	↖	↗	↙	↘	↗	↘	↙	↘
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↖↗	↖	↖	↖↗	↖	↖	↖↗	↖	↖	↖↗	↖	
Traffic Volume (vph)	6	700	699	201	626	3	767	4	257	3	6	14	
Future Volume (vph)	6	700	699	201	626	3	767	4	257	3	6	14	
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.90		
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1413		
Flt Permitted	0.31	1.00	1.00	0.15	1.00		0.74	1.00		0.54	1.00		
Satd. Flow (perm)	545	3167	1340	223	3106		1226	1395		937	1413		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	7	761	760	218	680	3	834	4	279	3	7	15	
RTOR Reduction (vph)	0	0	569	0	0	0	0	125	0	0	7	0	
Lane Group Flow (vph)	7	761	191	218	683	0	834	158	0	3	15	0	
Confl. Peds. (#/hr)							1					1	
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	7	4		3	8			2			6		
Permitted Phases	4		4	8			2			6			
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5		
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5		
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55		
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0		
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	116	796	337	183	1050		678	772		518	782		
v/s Ratio Prot	0.00	0.24		c0.11	0.22			0.11			0.01		
v/s Ratio Perm	0.01		0.14	c0.29			c0.68			0.00			
v/c Ratio	0.06	0.96	0.57	1.19	0.65		1.23	0.21		0.01	0.02		
Uniform Delay, d1	37.4	41.6	36.9	32.9	31.7		25.2	12.7		11.3	11.4		
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	0.3	22.8	6.8	127.4	3.1		116.2	0.6		0.0	0.0		
Delay (s)	37.7	64.5	43.7	160.4	34.8		141.4	13.3		11.3	11.4		
Level of Service	D	E	D	F	C		F	B		B	B		
Approach Delay (s)		54.0			65.2			108.9			11.4		
Approach LOS		D			E			F			B		
Intersection Summary													
HCM 2000 Control Delay		73.7			HCM 2000 Level of Service			E					
HCM 2000 Volume to Capacity ratio		1.19											
Actuated Cycle Length (s)		112.9			Sum of lost time (s)			12.0					
Intersection Capacity Utilization		99.1%			ICU Level of Service			F					
Analysis Period (min)		15											
c Critical Lane Group													

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2041 AM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	7	1	1	3	0	10	4	799	4	1	480	4
Future Volume (vph)	7	1	1	3	0	10	4	799	4	1	480	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0			1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.986			0.894				0.850			0.850
Flt Protected		0.962			0.989							
Satd. Flow (prot)	0	1313	0	0	1547	0	0	1606	1488	0	1563	1488
Flt Permitted		0.962			0.989							
Satd. Flow (perm)	0	1313	0	0	1547	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50				50			50
Link Distance (m)		1152.3			139.3				1712.9			1318.9
Travel Time (s)		83.0			10.0				123.3			95.0
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	8	1	1	3	0	11	4	868	4	1	522	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	14	0	0	872	4	0	523	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0				0.0			0.0
Link Offset(m)		0.0			0.0				0.0			0.0
Crosswalk Width(m)		4.8			4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2041 AM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	7	1	1	3	0	10	4	799	4	1	480	4
Future Volume (Veh/h)	7	1	1	3	0	10	4	799	4	1	480	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	1	1	3	0	11	4	868	4	1	522	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1411	1404	522	1402	1404	868	526			872		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1411	1404	522	1402	1404	868	526			872		
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	99	100	97	100	97	100			100		
cM capacity (veh/h)	96	140	559	117	140	355	1051			782		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	14	872	4	523	4
Volume Left	8	3	4	0	1	0
Volume Right	1	11	0	4	0	4
cSH	108	248	1051	1700	782	1700
Volume to Capacity	0.09	0.06	0.00	0.00	0.00	0.00
Queue Length 95th (m)	2.4	1.4	0.1	0.0	0.0	0.0
Control Delay (s)	41.7	20.4	0.1	0.0	0.0	0.0
Lane LOS	E	C	A		A	
Approach Delay (s)	41.7	20.4	0.1		0.0	
Approach LOS	E	C				

Intersection Summary

Average Delay	0.6
Intersection Capacity Utilization 62.6%	ICU Level of Service B
Analysis Period (min)	15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2041 AM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	1	0	6	11	0	3	3	792	3	1	484	0
Future Volume (vph)	1	0	6	11	0	3	3	792	3	1	484	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.882			0.973				0.850			
Flt Protected		0.994			0.962							
Satd. Flow (prot)	0	1534	0	0	1584	0	0	1606	1118	0	1560	1750
Flt Permitted		0.994			0.962							
Satd. Flow (perm)	0	1534	0	0	1584	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	7	12	0	3	3	861	3	1	526	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	15	0	0	864	3	0	527	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2041 AM PH3.syn
11-08-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	1	0	6	11	0	3	3	792	3	1	484	0
Future Volume (Veh/h)	1	0	6	11	0	3	3	792	3	1	484	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	0	7	12	0	3	3	861	3	1	526	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1398	1398	526	1402	1395	861	526			864		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1398	1398	526	1402	1395	861	526			864		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	90	100	99	100			100		
cM capacity (veh/h)	118	141	556	117	142	334	1051			484		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	8	15	864	3	527	0
Volume Left	1	12	3	0	1	0
Volume Right	7	3	0	3	0	0
cSH	380	134	1051	1700	484	1700
Volume to Capacity	0.02	0.11	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.5	2.9	0.1	0.0	0.0	0.0
Control Delay (s)	14.7	35.2	0.1	0.0	0.1	0.0
Lane LOS	B	E	A		A	
Approach Delay (s)	14.7	35.2	0.1	0.1		
Approach LOS	B	E				

Intersection Summary

Average Delay	0.5
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min)	15

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2041 AM PH3.syn
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	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	21	8	0	36	13	27	4	747	34	38	441	27
Future Volume (vph)	21	8	0	36	13	27	4	747	34	38	441	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			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					0.952				0.850			0.850
Flt Protected	0.965			0.977		0.950			0.950			
Satd. Flow (prot)	0	1292	0	0	1275	0	1662	1636	1305	1087	1606	1118
Flt Permitted	0.828			0.836		0.463			0.279			
Satd. Flow (perm)	0	1108	0	0	1091	0	810	1636	1305	319	1606	1118
Right Turn on Red		Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)					29			39			39	
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	388.1			2359.9			455.1			2151.0		
Travel Time (s)	27.9			169.9			32.8			154.9		
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Adj. Flow (vph)	23	9	0	39	14	29	4	812	37	41	479	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	82	0	4	812	37	41	479	29
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Right	Left	Left	Right	Left	Left	Right	Right
Median Width(m)	0.0			0.0			3.6			3.6		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	CI+Ex	CI+Ex		CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		CI+Ex			CI+Ex			CI+Ex			CI+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2041)
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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2041 AM PH3.syn
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	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)	11.0	11.0										
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		12.7			12.7		51.9	51.9	51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio		0.16			0.36		0.01	0.66	0.04	0.17	0.39	0.03
Control Delay	25.4	22.2			22.2		3.5	9.3	1.4	6.0	5.4	1.2
Queue Delay	0.0				0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	22.2			22.2		3.5	9.3	1.4	6.0	5.4	1.2
LOS	C			C			A	A	A	A	A	A
Approach Delay	25.4			22.2			8.9				5.2	
Approach LOS	C			C			A				A	
Queue Length 50th (m)	3.7			6.2			0.2	50.3	0.0	1.5	21.4	0.0
Queue Length 95th (m)	10.6			18.0			1.0	108.3	2.4	6.0	43.6	1.8
Internal Link Dist (m)	364.1			2335.9			431.1				2127.0	
Turn Bay Length (m)							110.0		190.0	55.0		15.0
Base Capacity (vph)	436			447			613	1238	997	241	1216	856
Starvation Cap Reductn	0			0			0	0	0	0	0	0
Spillback Cap Reductn	0			0			0	0	0	0	0	0
Storage Cap Reductn	0			0			0	0	0	0	0	0
Reduced v/c Ratio	0.07			0.18			0.01	0.66	0.04	0.17	0.39	0.03

Intersection Summary

Area Type: Other

Cycle Length: 83

Actuated Cycle Length: 68.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.7

Intersection LOS: A

Intersection Capacity Utilization 57.7%

ICU Level of Service B

Analysis Period (min) 15

Scenario 1 Nyon Marine Fuelling Corp Phase 1 TIS 5:00 pm 09-09-2020 AM - Total (2041)
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Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

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Splits and Phases: 6: Highway 140 & Concession 2 Road

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2041 AM PH3.syn
11-08-2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	8	0	36	13	27	4	747	34	38	441	27
Future Volume (vph)	21	8	0	36	13	27	4	747	34	38	441	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1292			1275		1662	1636	1305	1087	1606	1118
Flt Permitted		0.83			0.84		0.46	1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)		1108			1091		810	1636	1305	320	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	9	0	39	14	29	4	812	37	41	479	29
RTOR Reduction (vph)	0	0	0	0	25	0	0	0	10	0	0	8
Lane Group Flow (vph)	0	32	0	0	57	0	4	812	27	41	479	21
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.7			8.7		48.1	48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.7			10.7		51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15		0.73	0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		169			167		592	1197	955	234	1175	818
v/s Ratio Prot								c0.50			0.30	
v/s Ratio Perm		0.03			c0.05		0.00		0.02	0.13		0.02
v/c Ratio		0.19			0.34		0.01	0.68	0.03	0.18	0.41	0.03
Uniform Delay, d1		25.8			26.4		2.5	5.0	2.6	2.9	3.6	2.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.2		0.0	3.1	0.1	1.6	1.1	0.1
Delay (s)		26.3			27.7		2.5	8.1	2.6	4.5	4.6	2.6
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.3			27.7			7.8			4.5	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			8.1		HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			69.8		Sum of lost time (s)				8.0			
Intersection Capacity Utilization			57.7%		ICU Level of Service				B			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2041 AM PH3.syn
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	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	51	54	138	668	445	109
Future Volume (vph)	51	54	138	668	445	109
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.930				0.974	
Flt Protected	0.976			0.992		
Satd. Flow (prot)	1271	0	0	1565	1488	0
Flt Permitted	0.976			0.992		
Satd. Flow (perm)	1271	0	0	1565	1488	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	55	59	150	726	484	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	0	876	602	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization 95.7%	ICU Level of Service F
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2041 AM PH3.syn
11-08-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	51	54	138	668	445	109
Future Volume (Veh/h)	51	54	138	668	445	109
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	59	150	726	484	118
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1569	543	602			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1569	543	602			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	38	88	83			
cM capacity (veh/h)	89	498	872			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	114	876	602
Volume Left	55	150	0
Volume Right	59	0	118
cSH	155	872	1700
Volume to Capacity	0.74	0.17	0.35
Queue Length 95th (m)	35.7	4.9	0.0
Control Delay (s)	74.6	4.2	0.0
Lane LOS	F	A	
Approach Delay (s)	74.6	4.2	0.0
Approach LOS	F		

Intersection Summary

Average Delay	7.6
Intersection Capacity Utilization 95.7%	ICU Level of Service F
Analysis Period (min)	15

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↖↖	↖	↖	↖↖		↖	↖		↖	↖	↖
Traffic Volume (vph)	15	798	800	271	910	6	772	4	250	0	3	22
Future Volume (vph)	15	798	800	271	910	6	772	4	250	0	3	22
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.867	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3165	0	1583	1374	0	1750	1400	0
Flt Permitted	0.147			0.108			0.740					
Satd. Flow (perm)	245	3197	1430	183	3165	0	1232	1374	0	1750	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			870		1			218			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			3375.6			350.8	
Travel Time (s)		80.9			139.5			243.0			25.3	
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	16	867	870	295	989	7	839	4	272	0	3	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	867	870	295	996	0	839	276	0	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2041)
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Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	NA	NA	Perm	NA	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0	15.0	
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0	43.0	
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9	59.9	
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%	53.1%	
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9	52.9	
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0	5.0	
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0	23.0	
Pedestrian Calls (#/hr)		0	0		0		0	0		0	0	
Act Effect Green (s)	41.0	36.0	36.0	49.0	45.4		55.9	55.9			55.9	
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.40		0.50	0.50			0.50	
v/c Ratio	0.11	0.85	0.83	1.53	0.78		1.38	0.35			0.04	
Control Delay	20.3	45.4	10.3	285.6	35.6		207.1	5.4			6.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	20.3	45.4	10.3	285.6	35.6		207.1	5.4			6.4	
LOS	C	D	B	F	D		F	A			A	
Approach Delay		27.7			92.8			157.1			6.4	
Approach LOS		C			F			F			A	
Queue Length 50th (m)	2.1	98.7	0.0	-80.6	98.4		-258.6	6.9			0.4	
Queue Length 95th (m)	6.4	#127.0	49.2	#137.3	#152.7		#335.1	22.7			5.2	
Internal Link Dist (m)		1099.3			1913.5			3351.6			326.8	
Turn Bay Length (m)	130.0		100.0	180.0			300.0					
Base Capacity (vph)	148	1019	1048	193	1273		609	790			705	
Starvation Cap Reductn	0	0	0	0	0		0	0			0	
Spillback Cap Reductn	0	0	0	0	0		0	0			0	
Storage Cap Reductn	0	0	0	0	0		0	0			0	
Reduced v/c Ratio	0.11	0.85	0.83	1.53	0.78		1.38	0.35			0.04	

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.53

Intersection Signal Delay: 82.1

Intersection LOS: F

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2041)
PTSL (200364)Synchro 11 Report
Page 2

1: Highway 140 & Regional Road 27

TT 2041 PM PH3.syn

11-10-2024

Intersection Capacity Utilization 110.1%

ICU Level of Service H

Analysis Period (min) 15

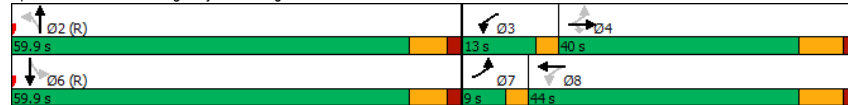
- ~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis

1: Highway 140 & Regional Road 27

TT 2041 PM PH3.syn

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	798	800	271	910	6	772	4	250	0	3	22
Future Volume (vph)	15	798	800	271	910	6	772	4	250	0	3	22
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0				4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00				1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99				0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85				0.87
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00				1.00
Satd. Flow (prot)	1583	3197	1430	1614	3164		1582	1375				1400
Flt Permitted	0.15	1.00	1.00	0.11	1.00		0.74	1.00				1.00
Satd. Flow (perm)	244	3197	1430	184	3164		1232	1375				1400
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	867	870	295	989	7	839	4	272	0	3	24
RTOR Reduction (vph)	0	0	579	0	1	0	0	114	0	0	12	0
Lane Group Flow (vph)	16	867	291	295	995	0	839	162	0	0	15	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1				51.1
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1				54.1
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48				0.48
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0				7.0
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0				3.0
Lane Grp Cap (vph)	90	1070	478	188	1272		590	658				670
v/s Ratio Prot	0.00	0.27		c0.12	0.31			0.12				0.01
v/s Ratio Perm	0.05		0.20	c0.51			c0.68					
v/c Ratio	0.18	0.81	0.61	1.57	0.78		1.42	0.25				0.02
Uniform Delay, d1	28.8	34.3	31.4	27.2	29.4		29.4	17.4				15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00				1.00
Incremental Delay, d2	1.3	6.7	5.7	280.2	4.9		199.7	0.9				0.1
Delay (s)	30.1	40.9	37.1	307.5	34.3		229.1	18.3				15.5
Level of Service	C	D	D	F	C		F	B				B
Approach Delay (s)		38.9			96.7			176.9				15.5
Approach LOS		D			F			F				B
Intersection Summary												
HCM 2000 Control Delay	93.3			HCM 2000 Level of Service					F			
HCM 2000 Volume to Capacity ratio	1.45											
Actuated Cycle Length (s)	112.9			Sum of lost time (s)					12.0			
Intersection Capacity Utilization	110.1%			ICU Level of Service					H			
Analysis Period (min)	15											

c Critical Lane Group

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2041 PM PH3.syn
11-10-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	10	0	8	10	4	7	7	638	8	6	740	10
Future Volume (vph)	10	0	8	10	4	7	7	638	8	6	740	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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	0.939				0.953				0.850			0.850
Flt Protected	0.973				0.977			0.999				
Satd. Flow (prot)	0	1599	0	0	1629	0	0	1682	1488	0	1697	1488
Flt Permitted	0.973				0.977			0.999				
Satd. Flow (perm)	0	1599	0	0	1629	0	0	1682	1488	0	1697	1488
Link Speed (k/h)	50			50			50			50		
Link Distance (m)	1152.3			139.3			1712.9			1313.7		
Travel Time (s)	83.0			10.0			123.3			94.6		
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	11	0	9	11	4	8	8	693	9	7	804	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	23	0	0	701	9	0	811	11
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0			0.0			0.0			0.0		
Link Offset(m)	0.0			0.0			0.0			0.0		
Crosswalk Width(m)	4.8			4.8			4.8			4.8		
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control	Stop			Stop			Free			Free		

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.3% ICU Level of Service B

Analysis Period (min) 15

HCM Unsignalized Intersection Capacity Analysis
4: Highway 140 & Forks Road

TT 2041 PM PH3.syn
11-10-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	10	0	8	10	4	7	7	638	8	6	740	10
Future Volume (Veh/h)	10	0	8	10	4	7	7	638	8	6	740	10
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	11	0	9	11	4	8	8	693	9	7	804	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1537	1536	804	1536	1538	693	815			702		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1537	1536	804	1536	1538	693	815			702		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	88	100	98	88	97	98	99			99		
cM capacity (veh/h)	90	115	386	92	115	447	821			830		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	20	23	701	9	811	11
Volume Left	11	11	8	0	7	0
Volume Right	9	8	0	9	0	11
cSH	138	134	821	1700	830	1700
Volume to Capacity	0.15	0.17	0.01	0.01	0.01	0.01
Queue Length 95th (m)	3.9	4.8	0.2	0.0	0.2	0.0
Control Delay (s)	35.6	37.4	0.3	0.0	0.2	0.0
Lane LOS	E	E	A		A	
Approach Delay (s)	35.6	37.4	0.3		0.2	
Approach LOS	E	E				

Intersection Summary

Average Delay

1.2

Intersection Capacity Utilization

59.3%

ICU Level of Service

B

Analysis Period (min)

15

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2041 PM PH3.syn
11-10-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (vph)	4	1	1	3	0	4	4	658	11	7	751	3
Future Volume (vph)	4	1	1	3	0	4	4	658	11	7	751	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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			0.923				0.850			0.850
Flt Protected		0.968			0.979							
Satd. Flow (prot)	0	1655	0	0	1385	0	0	1683	1271	0	1716	1488
Flt Permitted		0.968			0.979							
Satd. Flow (perm)	0	1655	0	0	1385	0	0	1683	1271	0	1716	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	4	1	1	3	0	4	4	715	12	8	816	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	7	0	0	719	12	0	824	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization 60.0%	ICU Level of Service B											
Analysis Period (min) 15												

HCM Unsignalized Intersection Capacity Analysis
5: Highway 140 & Concession 3 Road

TT 2041 PM PH3.syn
11-10-2024

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement		↔			↔			↔	↔		↔	↔
Lane Configurations		↔			↔			↔	↔		↔	↔
Traffic Volume (veh/h)	4	1	1	3	0	4	4	658	11	7	751	3
Future Volume (Veh/h)	4	1	1	3	0	4	4	658	11	7	751	3
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	4	1	1	3	0	4	4	715	12	8	816	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1559	1567	816	1556	1558	715	819			727		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1559	1567	816	1556	1558	715	819			727		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	96	99	100	96	100	99	100			99		
cM capacity (veh/h)	90	111	380	76	112	434	818			886		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	6	7	719	12	824	3						
Volume Left	4	3	4	0	8	0						
Volume Right	1	4	0	12	0	3						
cSH	107	144	818	1700	886	1700						
Volume to Capacity	0.06	0.05	0.00	0.01	0.01	0.00						
Queue Length 95th (m)	1.4	1.2	0.1	0.0	0.2	0.0						
Control Delay (s)	40.5	31.3	0.1	0.0	0.2	0.0						
Lane LOS	E	D	A		A							
Approach Delay (s)	40.5	31.3	0.1		0.2							
Approach LOS	E	D										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			60.0%				ICU Level of Service			B		
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2041 PM PH3.syn
11-10-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	29	8	6	70	14	21	0	620	59	27	694	32
Future Volume (vph)	29	8	6	70	14	21	0	620	59	27	694	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt	0.980				0.973				0.850			0.850
Flt Protected	0.968				0.968				0.950			
Satd. Flow (prot)	0	1497	0	0	1609	0	1716	1681	1400	1395	1709	1458
Flt Permitted	0.796				0.770				0.347			
Satd. Flow (perm)	0	1230	0	0	1280	0	1716	1681	1400	510	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)	7				16				64			39
Link Speed (k/h)	50				50				50			50
Link Distance (m)	388.1				2359.9				455.1			2151.0
Travel Time (s)	27.9				169.9				32.8			154.9
Confl. Peds. (#/hr)	1					1						
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	32	9	7	76	15	23	0	674	64	29	754	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	0	0	114	0	0	674	64	29	754	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)	0.0				0.0				3.6			3.6
Link Offset(m)	0.0				0.0				0.0			0.0
Crosswalk Width(m)	4.8				4.8				4.8			4.8
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2041)
PTSL (200364)

Synchro 11 Report
Page 9

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2041 PM PH3.syn
11-10-2024

	↖	→	↗	↖	←	↖	↖	↖	↖	↖	↖	↖
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effect Green (s)		13.6			13.6			52.0	52.0	52.0	52.0	52.0
Actuated g/C Ratio		0.20			0.20			0.75	0.75	0.75	0.75	0.75
v/c Ratio		0.20			0.43			0.54	0.06	0.08	0.59	0.03
Control Delay		22.6			26.6			7.5	1.5	4.8	8.4	1.6
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		22.6			26.6			7.5	1.5	4.8	8.4	1.6
LOS		C			C			A	A	A	A	A
Approach Delay		22.6			26.6			7.0			8.0	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		4.7			11.8			35.9	0.0	1.0	43.0	0.0
Queue Length 95th (m)		13.2			26.0			79.9	3.5	4.3	96.4	2.5
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)								190.0	55.0			15.0
Base Capacity (vph)		482			507			1258	1064	381	1279	1101
Starvation Cap Reductn		0			0			0	0	0	0	0
Spillback Cap Reductn		0			0			0	0	0	0	0
Storage Cap Reductn		0			0			0	0	0	0	0
Reduced v/c Ratio		0.10			0.22			0.54	0.06	0.08	0.59	0.03
Intersection Summary												
Area Type:		Other										
Cycle Length:		83										
Actuated Cycle Length:		69.5										
Natural Cycle:		60										
Control Type:		Actuated-Uncoordinated										
Maximum v/c Ratio:		0.59										
Intersection Signal Delay:		9.2						Intersection LOS:	A			
Intersection Capacity Utilization		54.9%						ICU Level of Service	A			

Scenario 1 Nyon Marine Fueling Corp Phase 1 TIS 5:00 pm 09-14-2020 PM - Total (2041)
PTSL (200364)

Synchro 11 Report
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Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2041 PM PH3.syn
11-10-2024

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road

 Ø2	 Ø4
52 s	31 s
 Ø6	 Ø8
52 s	51 s

HCM Signalized Intersection Capacity Analysis
6: Highway 140 & Concession 2 Road

TT 2041 PM PH3.syn
11-10-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	8	6	70	14	21	0	620	59	27	694	32
Future Volume (vph)	29	8	6	70	14	21	0	620	59	27	694	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1496			1608			1681	1400	1395	1709	1458
Flt Permitted		0.80			0.77			1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)		1230			1280			1681	1400	510	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	7	76	15	23	0	674	64	29	754	35
RTOR Reduction (vph)	0	6	0	0	13	0	0	0	18	0	0	10
Lane Group Flow (vph)	0	42	0	0	101	0	0	674	46	29	754	25
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2		6		6
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.5			9.5			48.2	48.2	48.2	48.2	48.2
Effective Green, g (s)		11.5			11.5			51.2	51.2	51.2	51.2	51.2
Actuated g/C Ratio		0.16			0.16			0.72	0.72	0.72	0.72	0.72
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		200			208			1217	1013	369	1237	1055
v/s Ratio Prot							0.40			c0.44		
v/s Ratio Perm		0.03			c0.08				0.03	0.06		0.02
v/c Ratio		0.21			0.48			0.55	0.05	0.08	0.61	0.02
Uniform Delay, d1		25.7			26.9			4.5	2.8	2.9	4.8	2.7
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.8			1.8	0.1	0.4	2.2	0.0
Delay (s)		26.2			28.7			6.3	2.9	3.3	7.1	2.8
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.2			28.7			6.0			6.7	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.4			HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		70.7			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		54.9%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

c Critical Lane Group

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2041 PM PH3.syn
11-10-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	101	155	71	549	700	58
Future Volume (vph)	101	155	71	549	700	58
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.918				0.990	
Flt Protected	0.981			0.994		
Satd. Flow (prot)	1261	0	0	1635	1670	0
Flt Permitted	0.981			0.994		
Satd. Flow (perm)	1261	0	0	1635	1670	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	110	168	77	597	761	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	278	0	0	674	824	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	105.9%
Analysis Period (min)	15
ICU Level of Service	G

HCM Unsignalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

TT 2041 PM PH3.syn
11-10-2024

	EBL	EBR	NBL	NBT	SBT	SBR
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	101	155	71	549	700	58
Future Volume (Veh/h)	101	155	71	549	700	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	110	168	77	597	761	63
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1544	792	824			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1544	792	824			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	0	53	89			
cM capacity (veh/h)	100	355	715			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	278	674	824
Volume Left	110	77	0
Volume Right	168	0	63
cSH	176	715	1700
Volume to Capacity	1.58	0.11	0.48
Queue Length 95th (m)	147.0	2.9	0.0
Control Delay (s)	331.8	2.8	0.0
Lane LOS	F	A	
Approach Delay (s)	331.8	2.8	0.0
Approach LOS	F		

Intersection Summary

Average Delay	53.0
Intersection Capacity Utilization	105.9%
Analysis Period (min)	15
ICU Level of Service	G

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 12:59:50 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - TT 2041 (PH3)						
Leg North	1.98	2.24	9.46	0.64	A	10.32	B
Leg West	0.32	~1	5.66	0.23	A		
Leg South	2.73	6.47	12.69	0.72	B		
Leg East	0.14	~1	6.72	0.11	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 12:59:50 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - TT 2041 (PH3), AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2041 (PH3), AM	TT 2041 (PH3)	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				10.32	B

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	693.00	100.000
West	ONE HOUR	✓	183.00	100.000
South	ONE HOUR	✓	719.00	100.000
East	ONE HOUR	✓	69.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	139.000	498.000	56.000
	West	137.000	0.000	43.000	3.000
	South	653.000	38.000	0.000	28.000
	East	56.000	0.000	13.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.20	0.72	0.08
	West	0.75	0.00	0.23	0.02
	South	0.91	0.05	0.00	0.04
	East	0.81	0.00	0.19	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.110	1.110	1.270
	West	1.000	1.000	1.170	1.000
	South	1.070	1.070	1.000	1.360
	East	1.150	1.500	1.170	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	11.0	11.0	27.0
	West	0.0	0.0	17.0	0.0
	South	7.0	7.0	0.0	36.0
	East	15.0	50.0	17.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.64	9.46	1.98	2.24	A	635.91	953.86	119.92	7.54	1.33	119.94	7.54
West	0.23	5.66	0.32	~1	A	167.92	251.89	21.13	5.03	0.23	21.13	5.03
South	0.72	12.69	2.73	6.47	B	659.77	989.65	151.58	9.19	1.68	151.60	9.19
East	0.11	6.72	0.14	~1	A	63.32	94.97	9.33	5.90	0.10	9.33	5.90

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	521.73	130.43	518.31	632.65	38.14	0.00	1199.63	1145.40	0.435	0.00	0.85	5.896	A
West	137.77	34.44	137.10	132.37	424.08	0.00	976.26	642.48	0.141	0.00	0.17	4.437	A
South	541.30	135.33	537.43	414.41	146.77	0.00	1136.76	883.66	0.476	0.00	0.97	6.440	A
East	51.95	12.99	51.65	65.06	619.14	0.00	863.37	451.82	0.060	0.00	0.07	5.116	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	622.99	155.75	621.60	758.57	45.73	0.00	1195.23	1145.40	0.521	0.85	1.20	7.020	A
West	164.51	41.13	164.30	158.74	508.59	0.00	927.35	642.48	0.177	0.17	0.22	4.883	A

South	646.37	161.59	644.46	496.96	175.93	0.00	1119.88	883.66	0.577	0.97	1.44	8.137	A
East	62.03	15.51	61.93	78.02	742.37	0.00	792.05	451.81	0.078	0.07	0.10	5.688	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	763.01	190.75	760.01	926.60	55.86	0.00	1189.37	1145.41	0.642	1.20	1.95	9.335	A
West	201.49	50.37	201.12	194.02	621.85	0.00	861.80	642.49	0.234	0.22	0.31	5.639	A
South	791.63	197.91	786.73	607.69	215.28	0.00	1097.11	883.66	0.722	1.44	2.67	12.278	B
East	75.97	18.99	75.80	95.35	906.66	0.00	696.96	451.81	0.109	0.10	0.14	6.684	A

Main results: (08:45-09:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	763.01	190.75	762.90	931.23	56.14	0.00	1189.21	1145.41	0.642	1.95	1.98	9.462	A
West	201.49	50.37	201.48	194.85	624.19	0.00	860.44	642.49	0.234	0.31	0.32	5.655	A
South	791.63	197.91	791.39	609.89	215.79	0.00	1096.81	883.66	0.722	2.67	2.73	12.689	B
East	75.97	18.99	75.97	95.77	911.40	0.00	694.22	451.81	0.109	0.14	0.14	6.717	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	622.99	155.75	625.95	765.40	46.14	0.00	1195.00	1145.40	0.521	1.98	1.24	7.132	A
West	164.51	41.13	164.87	159.97	512.11	0.00	925.31	642.48	0.178	0.32	0.23	4.903	A
South	646.37	161.59	651.27	500.27	176.71	0.00	1119.43	883.66	0.577	2.73	1.50	8.381	A
East	62.03	15.51	62.20	78.65	749.34	0.00	788.01	451.81	0.079	0.14	0.10	5.725	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	521.73	130.43	523.20	639.01	38.52	0.00	1199.41	1145.40	0.435	1.24	0.87	5.982	A
West	137.77	34.44	137.99	133.66	428.06	0.00	973.96	642.48	0.141	0.23	0.17	4.459	A
South	541.30	135.33	543.34	418.21	147.84	0.00	1136.14	883.66	0.476	1.50	1.00	6.576	A
East	51.95	12.99	52.05	65.70	625.48	0.00	859.70	451.82	0.060	0.10	0.07	5.144	A

Queueing Delay Results for each time segment**Queueing Delay results: (08:00-08:15)**

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	12.30	0.82	5.896	A	A
West	2.48	0.17	4.437	A	A
South	13.89	0.93	6.440	A	A
East	1.07	0.07	5.116	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.43	1.16	7.020	A	A
West	3.27	0.22	4.883	A	A
South	20.76	1.38	8.137	A	A
East	1.43	0.10	5.688	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	27.77	1.85	9.335	A	A
West	4.60	0.31	5.639	A	A
South	37.08	2.47	12.278	B	B

East	2.05	0.14	6.684	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	29.53	1.97	9.462	A	A
West	4.72	0.31	5.655	A	A
South	40.60	2.71	12.689	B	B
East	2.11	0.14	6.717	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.39	1.29	7.132	A	A
West	3.45	0.23	4.903	A	A
South	23.79	1.59	8.381	A	A
East	1.52	0.10	5.725	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	13.50	0.90	5.982	A	A
West	2.62	0.17	4.459	A	A
South	15.46	1.03	6.576	A	A
East	1.14	0.08	5.144	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.85	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.97	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.20	0.00	0.00	1.12	2.24			N/A	N/A
West	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.44	0.00	0.00	2.16	3.24			N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.95	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.31	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.67	0.00	0.00	0.00	6.47			N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

						very big.			

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.98	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.73	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.14	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.24	0.00	0.00	1.12	2.24			N/A	N/A
West	0.23	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.50	0.00	0.00	2.16	4.32			N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.87	0.00	0.00	1.12	1.12			N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.00	0.00	0.00	1.08	2.16			N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Netherby.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady

Report generation date: 2024-11-07 1:00:11 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
	> 10 Years - TT 2041 (PH3)						
Leg North	4.24	13.38	16.47	0.81	C	12.39	B
Leg West	0.32	~1	6.51	0.24	A		
Leg South	1.79	2.10	9.10	0.63	A		
Leg East	0.13	~1	6.11	0.10	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - Base Year (2024), AM" model duration: 8:00 AM - 9:30 AM
 "D2 - Base Year (2024), PM" model duration: 4:30 PM - 6:00 PM
 "D3 - BG 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D4 - BG 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D5 - BG 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D6 - BG 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D7 - BG 2036, AM" model duration: 8:00 AM - 9:30 AM
 "D8 - BG 2036, PM" model duration: 4:30 PM - 6:00 PM
 "D9 - BG 2041, AM" model duration: 8:00 AM - 9:30 AM
 "D10 - BG 2041, PM" model duration: 4:30 PM - 6:00 PM
 "D11 - TT 2026, AM" model duration: 8:00 AM - 9:30 AM
 "D12 - TT 2026, PM" model duration: 4:30 PM - 6:00 PM
 "D13 - TT 2031, AM" model duration: 8:00 AM - 9:30 AM
 "D14 - TT 2031, PM" model duration: 4:30 PM - 6:00 PM
 "D15 - TT 2036 (PH2), AM" model duration: 8:00 AM - 9:30 AM
 "D16 - TT 2036 (PH2), PM" model duration: 4:30 PM - 6:00 PM
 "D17 - TT 2036 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D18 - TT 2036 (PH3), PM" model duration: 4:30 PM - 6:00 PM
 "D19 - TT 2041 (PH3), AM" model duration: 8:00 AM - 9:30 AM
 "D20 - TT 2041 (PH3), PM " model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-07 1:00:10 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)

7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

> 10 Years - TT 2041 (PH3), PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set(s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
> 10 Years	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
TT 2041 (PH3), PM	TT 2041 (PH3)	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				12.39	B

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Netherby Road	
South	South	Highway 140	
East	East	Netherby Road	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	3.50	4.50	30.00	20.00	40.00	25.00	
West	3.50	4.50	30.00	20.00	40.00	25.00	
South	3.50	4.50	30.00	20.00	40.00	25.00	
East	3.50	4.50	30.00	20.00	40.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.579	1221.701
West		(calculated)	(calculated)	0.579	1221.701
South		(calculated)	(calculated)	0.579	1221.701
East		(calculated)	(calculated)	0.579	1221.701

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	871.00	100.000
West	ONE HOUR	✓	163.00	100.000
South	ONE HOUR	✓	651.00	100.000
East	ONE HOUR	✓	71.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	148.000	682.000	41.000
	West	95.000	0.000	64.000	4.000
	South	551.000	52.000	0.000	48.000
	East	60.000	0.000	11.000	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.00	0.17	0.78	0.05
	West	0.58	0.00	0.39	0.02
	South	0.85	0.08	0.00	0.07
	East	0.85	0.00	0.15	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	1.000	1.050	1.020	1.120
	West	1.070	1.000	1.000	1.000
	South	1.050	1.000	1.000	1.140
	East	1.180	1.000	1.220	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
		North	West	South	East
	North	0.0	5.0	2.0	12.0
	West	7.0	0.0	0.0	0.0
	South	5.0	0.0	0.0	14.0
	East	18.0	0.0	22.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.81	16.47	4.24	13.38	C	799.24	1198.87	215.07	10.76	2.39	215.12	10.77
West	0.24	6.51	0.32	~1	A	149.57	224.36	21.01	5.62	0.23	21.02	5.62
South	0.63	9.10	1.79	2.10	A	597.37	896.05	107.77	7.22	1.20	107.78	7.22
East	0.10	6.11	0.13	~1	A	65.15	97.73	8.97	5.50	0.10	8.97	5.50

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	655.73	163.93	650.81	528.32	47.14	0.00	1194.42	1133.09	0.549	0.00	1.23	6.757	A
West	122.71	30.68	122.07	149.49	548.46	0.00	904.28	633.49	0.136	0.00	0.16	4.780	A
South	490.11	122.53	487.07	565.75	104.77	0.00	1161.06	968.15	0.422	0.00	0.76	5.594	A
East	53.45	13.36	53.16	69.54	522.30	0.00	919.42	489.00	0.058	0.00	0.07	4.928	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	783.01	195.75	780.22	633.41	56.52	0.00	1188.99	1133.10	0.659	1.23	1.93	9.002	A
West	146.53	36.63	146.31	179.22	657.52	0.00	841.16	633.49	0.174	0.16	0.22	5.385	A

South	585.24	146.31	583.97	678.24	125.59	0.00	1149.01	968.15	0.509	0.76	1.08	6.687	A
East	63.83	15.96	63.74	83.37	626.19	0.00	859.29	489.00	0.074	0.07	0.09	5.367	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	958.99	239.75	950.42	774.62	69.12	0.00	1181.70	1133.10	0.812	1.93	4.07	15.463	C
West	179.47	44.87	179.06	218.53	801.01	0.00	758.11	633.49	0.237	0.22	0.32	6.459	A
South	716.76	179.19	714.01	826.58	153.49	0.00	1132.87	968.15	0.633	1.08	1.77	8.981	A
East	78.17	19.54	78.03	101.78	765.72	0.00	778.53	489.00	0.100	0.09	0.13	6.093	A

Main results: (17:15-17:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	958.99	239.75	958.33	777.23	69.36	0.00	1181.56	1133.10	0.812	4.07	4.24	16.469	C
West	179.47	44.87	179.45	220.09	807.60	0.00	754.29	633.49	0.238	0.32	0.32	6.510	A
South	716.76	179.19	716.67	832.95	154.10	0.00	1132.51	968.15	0.633	1.77	1.79	9.101	A
East	78.17	19.54	78.17	102.36	768.42	0.00	776.97	489.00	0.101	0.13	0.13	6.109	A

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	783.01	195.75	791.79	637.34	56.88	0.00	1188.78	1133.10	0.659	4.24	2.04	9.531	A
West	146.53	36.63	146.93	181.50	667.16	0.00	835.57	633.49	0.175	0.32	0.22	5.437	A
South	585.24	146.31	587.96	687.58	126.51	0.00	1148.48	968.15	0.510	1.79	1.11	6.790	A
East	63.83	15.96	63.97	84.23	630.24	0.00	856.94	489.00	0.074	0.13	0.10	5.386	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	655.73	163.93	658.81	532.85	47.55	0.00	1194.18	1133.09	0.549	2.04	1.27	6.962	A
West	122.71	30.68	122.95	151.20	555.16	0.00	900.40	633.49	0.136	0.22	0.17	4.816	A
South	490.11	122.53	491.44	572.42	105.68	0.00	1160.53	968.15	0.422	1.11	0.78	5.672	A
East	53.45	13.36	53.54	70.26	526.86	0.00	916.78	489.00	0.058	0.10	0.07	4.946	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	17.58	1.17	6.757	A	A
West	2.37	0.16	4.780	A	A
South	10.98	0.73	5.594	A	A
East	1.07	0.07	4.928	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	27.50	1.83	9.002	A	A
West	3.20	0.21	5.385	A	A
South	15.63	1.04	6.687	A	A
East	1.39	0.09	5.367	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	54.64	3.64	15.463	C	B
West	4.67	0.31	6.459	A	A
South	25.15	1.68	8.981	A	A

East	1.93	0.13	6.093	A	A

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	62.58	4.17	16.469	C	B
West	4.82	0.32	6.510	A	A
South	26.70	1.78	9.101	A	A
East	1.98	0.13	6.109	A	A

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	32.85	2.19	9.531	A	A
West	3.42	0.23	5.437	A	A
South	17.31	1.15	6.790	A	A
East	1.47	0.10	5.386	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	19.93	1.33	6.962	A	A
West	2.52	0.17	4.816	A	A
South	12.00	0.80	5.672	A	A
East	1.13	0.08	4.946	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.23	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	0.16	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.76	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.93	0.00	0.00	4.12	6.18			N/A	N/A
West	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.08	0.00	0.00	1.05	2.10			N/A	N/A
East	0.09	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.07	0.00	0.00	4.12	13.38			N/A	N/A
West	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.77	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

						very big.			

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	4.24	0.00	0.00	0.00	9.26			N/A	N/A
West	0.32	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.79	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.13	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	2.04	0.00	0.00	4.12	6.18			N/A	N/A
West	0.22	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	1.11	0.00	0.00	1.05	2.10			N/A	N/A
East	0.10	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	1.27	0.00	0.00	2.06	4.12			N/A	N/A
West	0.17	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.78	0.00	0.00	1.05	1.05			N/A	N/A
East	0.07	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2041 (Alternative) AM PH3.syn

12-17-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	700	723	241	626	3	776	4	272	3	6	14
Future Volume (vph)	6	700	723	241	626	3	776	4	272	3	6	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	100.0			100.0			100.0			100.0		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt			0.850		0.999			0.852			0.898	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1662	3167	1340	1458	3105	0	1568	1395	0	1662	1413	0
Flt Permitted	0.311			0.145			0.743			0.521		
Satd. Flow (perm)	544	3167	1340	223	3105	0	1226	1395	0	912	1413	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			786					296			15	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			219.0			350.8	
Travel Time (s)		80.9			139.5			15.8			25.3	
Confl. Peds. (#/hr)							1					1
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 (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Adj. Flow (vph)	7	761	786	262	680	3	843	4	296	3	7	15
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	761	786	262	683	0	843	300	0	3	22	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2041 (Alternative) AM PH3.syn
12-17-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0		15.0
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0		43.0
Total Split (s)	9.0	30.0	30.0	14.0	35.0		68.9	68.9		68.9		68.9
Total Split (%)	8.0%	26.6%	26.6%	12.4%	31.0%		61.0%	61.0%		61.0%		61.0%
Maximum Green (s)	6.0	22.1	22.1	11.0	27.1		61.9	61.9		61.9		61.9
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0		5.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0		-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0		3.0
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max		C-Max
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0		13.0
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0		23.0
Pedestrian Calls (#/hr)		0	0		0		0	0		0		0
Act Effct Green (s)	31.0	26.0	26.0	40.0	38.2		64.9	64.9		64.9		64.9
Actuated g/C Ratio	0.27	0.23	0.23	0.35	0.34		0.57	0.57		0.57		0.57
v/c Ratio	0.04	1.04	0.86	1.39	0.65		1.20	0.32		0.01		0.03
Control Delay	24.5	88.0	13.8	233.3	35.9		127.4	2.3		10.3		6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0		0.0
Total Delay	24.5	88.0	13.8	233.3	35.9		127.4	2.3		10.3		6.0
LOS	C	F	B	F	D		F	A		B		A
Approach Delay		50.2			90.6			94.6				6.5
Approach LOS		D			F			F				A
Queue Length 50th (m)	1.0	~101.0	0.0	~67.0	68.5		~237.6	0.4		0.3		0.7
Queue Length 95th (m)	4.4	#140.2	#82.9	#120.8	101.1		#314.6	12.2		1.6		4.2
Internal Link Dist (m)		1099.3			1913.5			195.0				326.8
Turn Bay Length (m)	130.0		100.0	180.0			300.0			90.0		
Base Capacity (vph)	198	729	913	188	1050		704	927		524		818
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	1.04	0.86	1.39	0.65		1.20	0.32		0.01		0.03

Intersection Summary

Area Type: Other

Cycle Length: 112.9

Actuated Cycle Length: 112.9

Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.39

Intersection Signal Delay: 74.2

Intersection LOS: E

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

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Intersection Capacity Utilization 103.1%

ICU Level of Service G

Analysis Period (min) 15

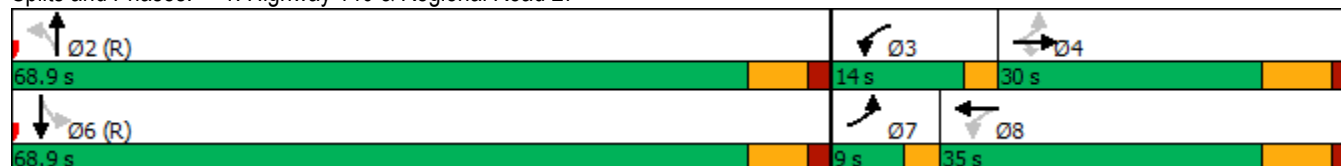
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27



HCM Signalized Intersection Capacity Analysis

1: Highway 140 & Regional Road 27

TT 2041 (Alternative) AM PH3.syn

12-17-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	700	723	241	626	3	776	4	272	3	6	14
Future Volume (vph)	6	700	723	241	626	3	776	4	272	3	6	14
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1662	3167	1340	1458	3106		1567	1395		1662	1413	
Flt Permitted	0.31	1.00	1.00	0.15	1.00		0.74	1.00		0.52	1.00	
Satd. Flow (perm)	545	3167	1340	223	3106		1226	1395		912	1413	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	761	786	262	680	3	843	4	296	3	7	15
RTOR Reduction (vph)	0	0	588	0	0	0	0	132	0	0	7	0
Lane Group Flow (vph)	7	761	198	262	683	0	843	168	0	3	15	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	5%	11%	14%	7%	0%	6%	0%	7%	0%	0%	15%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.7	24.5	24.5	38.5	34.3		59.5	59.5		59.5	59.5	
Effective Green, g (s)	23.7	28.4	28.4	37.5	38.2		62.5	62.5		62.5	62.5	
Actuated g/C Ratio	0.21	0.25	0.25	0.33	0.34		0.55	0.55		0.55	0.55	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0		7.0	7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	116	796	337	183	1050		678	772		504	782	
v/s Ratio Prot	0.00	0.24		c0.13	0.22			0.12			0.01	
v/s Ratio Perm	0.01		0.15	c0.35			c0.69			0.00		
v/c Ratio	0.06	0.96	0.59	1.43	0.65		1.24	0.22		0.01	0.02	
Uniform Delay, d1	37.4	41.6	37.1	32.9	31.7		25.2	12.8		11.3	11.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	22.8	7.3	222.7	3.1		121.7	0.6		0.0	0.0	
Delay (s)	37.7	64.5	44.4	255.6	34.8		146.9	13.4		11.3	11.4	
Level of Service	D	E	D	F	C		F	B		B	B	
Approach Delay (s)		54.2			96.0			111.9			11.4	
Approach LOS		D			F			F			B	
Intersection Summary												
HCM 2000 Control Delay			82.7			HCM 2000 Level of Service				F		
HCM 2000 Volume to Capacity ratio			1.28									
Actuated Cycle Length (s)			112.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			103.1%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

TT 2041 (Alternative) AM PH3.syn

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	1	1	3	0	10	4	686	4	1	437	4
Future Volume (vph)	7	1	1	3	0	10	4	686	4	1	437	4
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.986			0.894				0.850			0.850
Flt Protected		0.962			0.989							
Satd. Flow (prot)	0	1313	0	0	1547	0	0	1606	1488	0	1563	1488
Flt Permitted		0.962			0.989							
Satd. Flow (perm)	0	1313	0	0	1547	0	0	1606	1488	0	1563	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			1318.9	
Travel Time (s)		83.0			10.0			123.3			95.0	
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 (%)	33%	0%	0%	0%	0%	0%	0%	9%	0%	0%	12%	0%
Adj. Flow (vph)	8	1	1	3	0	11	4	746	4	1	475	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	10	0	0	14	0	0	750	4	0	476	4
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	56.1%											
Analysis Period (min)	15											
ICU Level of Service B												

HCM Unsignalized Intersection Capacity Analysis

4: Highway 140 & Forks Road

TT 2041 (Alternative) AM PH3.syn

12-17-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	1	1	3	0	10	4	686	4	1	437	4
Future Volume (Veh/h)	7	1	1	3	0	10	4	686	4	1	437	4
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	8	1	1	3	0	11	4	746	4	1	475	4
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1242	1235	475	1232	1235	746	479	750				
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1242	1235	475	1232	1235	746	479	750				
tC, single (s)	7.4	6.5	6.2	7.1	6.5	6.2	4.1	4.1				
tC, 2 stage (s)												
tF (s)	3.8	4.0	3.3	3.5	4.0	3.3	2.2	2.2				
p0 queue free %	94	99	100	98	100	97	100	100				
cM capacity (veh/h)	127	177	594	154	177	417	1094	868				
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	10	14	750	4	476	4						
Volume Left	8	3	4	0	1	0						
Volume Right	1	11	0	4	0	4						
cSH	142	305	1094	1700	868	1700						
Volume to Capacity	0.07	0.05	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	1.8	1.2	0.1	0.0	0.0	0.0						
Control Delay (s)	32.2	17.4	0.1	0.0	0.0	0.0						
Lane LOS	D	C	A	A								
Approach Delay (s)	32.2	17.4	0.1	0.0								
Approach LOS	D	C										
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	56.1%			ICU Level of Service					B			
Analysis Period (min)	15											

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

TT 2041 (Alternative) AM PH3.syn
12-17-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	0	6	11	0	3	3	679	3	1	441	0
Future Volume (vph)	1	0	6	11	0	3	3	679	3	1	441	0
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		1.0	0.0		1.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.882			0.973				0.850			
Flt Protected		0.994			0.962							
Satd. Flow (prot)	0	1534	0	0	1584	0	0	1606	1118	0	1560	1750
Flt Permitted		0.994			0.962							
Satd. Flow (perm)	0	1534	0	0	1584	0	0	1606	1118	0	1560	1750
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	0%	0%	17%	0%	9%	33%	100%	12%	0%
Adj. Flow (vph)	1	0	7	12	0	3	3	738	3	1	479	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	8	0	0	15	0	0	741	3	0	480	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	51.4%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM Unsignalized Intersection Capacity Analysis 5: Highway 140 & Concession 3 Road

TT 2041 (Alternative) AM PH3.syn
12-17-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	6	11	0	3	3	679	3	1	441	0
Future Volume (Veh/h)	1	0	6	11	0	3	3	679	3	1	441	0
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	1	0	7	12	0	3	3	738	3	1	479	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1228	1228	479	1232	1225	738	479			741		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1228	1228	479	1232	1225	738	479			741		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.4	4.1			5.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.5	2.2			3.1		
p0 queue free %	99	100	99	92	100	99	100			100		
cM capacity (veh/h)	155	179	591	153	180	394	1094			550		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	8	15	741	3	480	0						
Volume Left	1	12	3	0	1	0						
Volume Right	7	3	0	3	0	0						
cSH	437	174	1094	1700	550	1700						
Volume to Capacity	0.02	0.09	0.00	0.00	0.00	0.00						
Queue Length 95th (m)	0.4	2.2	0.1	0.0	0.0	0.0						
Control Delay (s)	13.4	27.6	0.1	0.0	0.1	0.0						
Lane LOS	B	D	A		A							
Approach Delay (s)	13.4	27.6	0.1		0.1							
Approach LOS	B	D										
Intersection Summary												
Average Delay	0.5											
Intersection Capacity Utilization	51.4%			ICU Level of Service					A			
Analysis Period (min)	15											

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

TT 2041 (Alternative) AM PH3.syn

12-17-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	8	0	36	13	27	4	634	34	38	398	27
Future Volume (vph)	21	8	0	36	13	27	4	634	34	38	398	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			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					0.952				0.850			0.850
Flt Protected		0.965			0.977		0.950			0.950		
Satd. Flow (prot)	0	1292	0	0	1275	0	1662	1636	1305	1087	1606	1118
Flt Permitted		0.828			0.836		0.492			0.343		
Satd. Flow (perm)	0	1108	0	0	1091	0	861	1636	1305	392	1606	1118
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					29				39			39
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		388.1			2359.9			455.1			2151.0	
Travel Time (s)		27.9			169.9			32.8			154.9	
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 (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Adj. Flow (vph)	23	9	0	39	14	29	4	689	37	41	433	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	82	0	4	689	37	41	433	29
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	

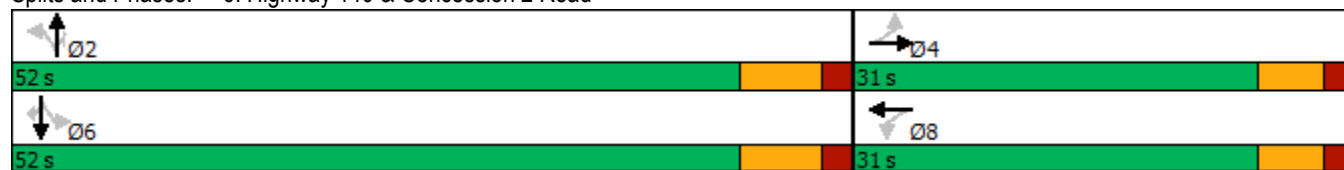
Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)		12.7			12.7		51.9	51.9	51.9	51.9	51.9	51.9
Actuated g/C Ratio		0.19			0.19		0.76	0.76	0.76	0.76	0.76	0.76
v/c Ratio		0.16			0.36		0.01	0.56	0.04	0.14	0.36	0.03
Control Delay		25.4			22.2		3.5	7.3	1.4	5.2	5.1	1.2
Queue Delay		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		25.4			22.2		3.5	7.3	1.4	5.2	5.1	1.2
LOS		C			C		A	A	A	A	A	A
Approach Delay		25.4			22.2			7.0			4.9	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		3.7			6.2		0.2	37.1	0.0	1.4	18.4	0.0
Queue Length 95th (m)		10.6			18.0		1.0	77.0	2.4	5.5	37.9	1.8
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)							110.0		190.0	55.0		15.0
Base Capacity (vph)		436			447		651	1238	997	296	1216	856
Starvation Cap Reductn		0			0		0	0	0	0	0	0
Spillback Cap Reductn		0			0		0	0	0	0	0	0
Storage Cap Reductcn		0			0		0	0	0	0	0	0
Reduced v/c Ratio		0.07			0.18		0.01	0.56	0.04	0.14	0.36	0.03
Intersection Summary												
Area Type: Other												
Cycle Length: 83												
Actuated Cycle Length: 68.6												
Natural Cycle: 60												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.56												
Intersection Signal Delay: 7.6 Intersection LOS: A												
Intersection Capacity Utilization 51.2% ICU Level of Service A												
Analysis Period (min) 15												

Splits and Phases: 6: Highway 140 & Concession 2 Road



HCM Signalized Intersection Capacity Analysis

6: Highway 140 & Concession 2 Road

TT 2041 (Alternative) AM PH3.syn

12-17-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	8	0	36	13	27	4	634	34	38	398	27
Future Volume (vph)	21	8	0	36	13	27	4	634	34	38	398	27
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1292			1275		1662	1636	1305	1087	1606	1118
Flt Permitted		0.83			0.84		0.49	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)		1108			1091		860	1636	1305	392	1606	1118
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	9	0	39	14	29	4	689	37	41	433	29
RTOR Reduction (vph)	0	0	0	0	25	0	0	0	10	0	0	8
Lane Group Flow (vph)	0	32	0	0	57	0	4	689	27	41	433	21
Heavy Vehicles (%)	33%	25%	0%	21%	0%	50%	0%	7%	14%	53%	9%	33%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		8.7			8.7		48.1	48.1	48.1	48.1	48.1	48.1
Effective Green, g (s)		10.7			10.7		51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio		0.15			0.15		0.73	0.73	0.73	0.73	0.73	0.73
Clearance Time (s)		6.0			6.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		169			167		629	1197	955	286	1175	818
v/s Ratio Prot							c0.42				0.27	
v/s Ratio Perm		0.03			c0.05		0.00		0.02	0.10		0.02
v/c Ratio		0.19			0.34		0.01	0.58	0.03	0.14	0.37	0.03
Uniform Delay, d1		25.8			26.4		2.5	4.3	2.6	2.8	3.4	2.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.2		0.0	2.0	0.1	1.1	0.9	0.1
Delay (s)		26.3			27.7		2.5	6.3	2.6	3.8	4.3	2.6
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.3			27.7			6.1			4.2	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.2			HCM 2000 Level of Service			A			
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			69.8			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			51.2%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2041 (Alternative) AM PH3.syn
12-17-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	94	11	25	668	445	222
Future Volume (vph)	94	11	25	668	445	222
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			1.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986				0.955	
Flt Protected	0.957			0.998		
Satd. Flow (prot)	1321	0	0	1608	1437	0
Flt Permitted	0.957			0.998		
Satd. Flow (perm)	1321	0	0	1608	1437	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	102	12	27	726	484	241
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	0	753	725	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	73.2%			ICU Level of Service D		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 7: Highway 140 & Access Rd

TT 2041 (Alternative) AM PH3.syn
12-17-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	94	11	25	668	445	222
Future Volume (Veh/h)	94	11	25	668	445	222
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	102	12	27	726	484	241
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1384	604	725			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1384	604	725			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	25	97	97			
cM capacity (veh/h)	136	458	781			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	114	753	725			
Volume Left	102	27	0			
Volume Right	12	0	241			
cSH	147	781	1700			
Volume to Capacity	0.78	0.03	0.43			
Queue Length 95th (m)	38.4	0.9	0.0			
Control Delay (s)	84.4	0.9	0.0			
Lane LOS	F	A				
Approach Delay (s)	84.4	0.9	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		6.5				
Intersection Capacity Utilization		73.2%		ICU Level of Service		D
Analysis Period (min)		15				

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2041 (Alternative) PM PH3.syn

12-17-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	798	812	292	910	6	799	4	296	0	3	22
Future Volume (vph)	15	798	812	292	910	6	799	4	296	0	3	22
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	130.0		100.0	180.0		0.0	300.0		0.0	90.0		0.0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	0.99			0.99	
Frt			0.850		0.999			0.852			0.867	
Flt Protected	0.950			0.950			0.950					
Satd. Flow (prot)	1583	3197	1430	1614	3165	0	1583	1374	0	1750	1400	0
Flt Permitted	0.147			0.108			0.740					
Satd. Flow (perm)	245	3197	1430	183	3165	0	1232	1374	0	1750	1400	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			883		1			218			24	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1123.3			1937.5			3375.6			350.8	
Travel Time (s)		80.9			139.5			243.0			25.3	
Confl. Peds. (#/hr)							1		3	3		1
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 (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Adj. Flow (vph)	16	867	883	317	989	7	868	4	322	0	3	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	16	867	883	317	996	0	868	326	0	0	27	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2	1	1	2		1	2		1	2	
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0	2.0	2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6	2.0	2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
1: Highway 140 & Regional Road 27

TT 2041 (Alternative) PM PH3.syn
12-17-2024

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2				6
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	6.0	20.0	20.0	6.0	20.0		15.0	15.0		15.0		15.0
Minimum Split (s)	9.0	27.9	27.9	9.0	27.9		43.0	43.0		43.0		43.0
Total Split (s)	9.0	40.0	40.0	13.0	44.0		59.9	59.9		59.9		59.9
Total Split (%)	8.0%	35.4%	35.4%	11.5%	39.0%		53.1%	53.1%		53.1%		53.1%
Maximum Green (s)	6.0	32.1	32.1	10.0	36.1		52.9	52.9		52.9		52.9
Yellow Time (s)	3.0	5.9	5.9	3.0	5.9		5.0	5.0		5.0		5.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	1.0	-3.9	-3.9	1.0	-3.9		-3.0	-3.0		-3.0		-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0		4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag							
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes							
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0		3.0		3.0
Recall Mode	None	Max	Max	None	Max		C-Max	C-Max		C-Max		C-Max
Walk Time (s)		8.0	8.0		8.0		13.0	13.0		13.0		13.0
Flash Dont Walk (s)		12.0	12.0		12.0		23.0	23.0		23.0		23.0
Pedestrian Calls (#/hr)		0	0		0		0	0		0		0
Act Effect Green (s)	41.0	36.0	36.0	49.0	45.4		55.9	55.9				55.9
Actuated g/C Ratio	0.36	0.32	0.32	0.43	0.40		0.50	0.50				0.50
v/c Ratio	0.11	0.85	0.84	1.64	0.78		1.43	0.41				0.04
Control Delay	20.3	45.4	10.5	333.8	35.6		227.4	7.5				6.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	20.3	45.4	10.5	333.8	35.6		227.4	7.5				6.4
LOS	C	D	B	F	D		F	A				A
Approach Delay		27.7			107.6			167.3				6.4
Approach LOS		C			F			F				A
Queue Length 50th (m)	2.1	98.7	0.0	~91.5	98.4		~272.6	13.3				0.4
Queue Length 95th (m)	6.4	#127.0	50.2	#149.2	#152.7		#350.1	33.9				5.2
Internal Link Dist (m)		1099.3			1913.5			3351.6				326.8
Turn Bay Length (m)	130.0		100.0	180.0			300.0					
Base Capacity (vph)	148	1019	1057	193	1273		609	790				705
Starvation Cap Reductn	0	0	0	0	0		0	0				0
Spillback Cap Reductn	0	0	0	0	0		0	0				0
Storage Cap Reductn	0	0	0	0	0		0	0				0
Reduced v/c Ratio	0.11	0.85	0.84	1.64	0.78		1.43	0.41				0.04
Intersection Summary												
Area Type:	Other											
Cycle Length:	112.9											
Actuated Cycle Length:	112.9											
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green											
Natural Cycle:	140											
Control Type:	Actuated-Coordinated											
Maximum v/c Ratio:	1.64											
Intersection Signal Delay:	90.7						Intersection LOS: F					

Lanes, Volumes, Timings

1: Highway 140 & Regional Road 27

TT 2041 (Alternative) PM PH3.syn
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Intersection Capacity Utilization 112.2% ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Highway 140 & Regional Road 27

 Ø2 (L)	 Ø3	 Ø4
59.9 s	13 s	40 s
 Ø5 (R)	 Ø7	 Ø8
59.9 s	9 s	44 s

HCM Signalized Intersection Capacity Analysis

1: Highway 140 & Regional Road 27

TT 2041 (Alternative) PM PH3.syn

12-17-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	798	812	292	910	6	799	4	296	0	3	22
Future Volume (vph)	15	798	812	292	910	6	799	4	296	0	3	22
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00			1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99			0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1583	3197	1430	1614	3164		1582	1374			1400	
Flt Permitted	0.15	1.00	1.00	0.11	1.00		0.74	1.00			1.00	
Satd. Flow (perm)	244	3197	1430	184	3164		1232	1374			1400	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	867	883	317	989	7	868	4	322	0	3	24
RTOR Reduction (vph)	0	0	587	0	1	0	0	114	0	0	12	0
Lane Group Flow (vph)	16	867	296	317	995	0	868	212	0	0	15	0
Confl. Peds. (#/hr)							1		3	3		1
Heavy Vehicles (%)	5%	4%	4%	3%	5%	0%	5%	0%	7%	0%	0%	8%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.3	33.9	33.9	46.9	41.5		51.1	51.1			51.1	
Effective Green, g (s)	34.3	37.8	37.8	45.9	45.4		54.1	54.1			54.1	
Actuated g/C Ratio	0.30	0.33	0.33	0.41	0.40		0.48	0.48			0.48	
Clearance Time (s)	3.0	7.9	7.9	3.0	7.9		7.0	7.0			7.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	90	1070	478	188	1272		590	658			670	
v/s Ratio Prot	0.00	0.27		c0.13	0.31			0.15			0.01	
v/s Ratio Perm	0.05		0.21	c0.55			c0.70					
v/c Ratio	0.18	0.81	0.62	1.69	0.78		1.47	0.32			0.02	
Uniform Delay, d1	28.8	34.3	31.5	27.2	29.4		29.4	18.1			15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.3	6.7	5.9	330.7	4.9		221.2	1.3			0.1	
Delay (s)	30.1	40.9	37.4	358.0	34.3		250.6	19.4			15.5	
Level of Service	C	D	D	F	C		F	B			B	
Approach Delay (s)		39.1			112.4			187.5			15.5	
Approach LOS		D			F			F			B	
Intersection Summary												
HCM 2000 Control Delay			102.5			HCM 2000 Level of Service			F			
HCM 2000 Volume to Capacity ratio			1.53									
Actuated Cycle Length (s)			112.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			112.2%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

Lanes, Volumes, Timings
2: Highway 140 & Netherby Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	4	64	37	0	60	52	624	105	41	715	148
Future Volume (vph)	95	4	64	37	0	60	52	624	105	41	715	148
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	55.0		80.0	110.0		95.0
Storage Lanes	0		0	0		0	0		0	0		0
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.947			0.916			0.982			0.978	
Flt Protected		0.972			0.981			0.997			0.998	
Satd. Flow (prot)	0	1548	0	0	1316	0	0	1618	0	0	1659	0
Flt Permitted		0.972			0.981			0.997			0.998	
Satd. Flow (perm)	0	1548	0	0	1316	0	0	1618	0	0	1659	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		732.1			1609.4			813.2			3375.6	
Travel Time (s)		52.7			115.9			58.6			243.0	
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 (%)	7%	0%	0%	22%	0%	18%	0%	5%	14%	12%	2%	5%
Adj. Flow (vph)	103	4	70	40	0	65	57	678	114	45	777	161
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	177	0	0	105	0	0	849	0	0	983	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Yield			Yield			Yield			Yield	
Intersection Summary												
Area Type:	Other											
Control Type:	Roundabout											
Intersection Capacity Utilization	86.2%											
Analysis Period (min)	15											
ICU Level of Service E												

HCM Unsignalized Intersection Capacity Analysis 2: Highway 140 & Netherby Road

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Traffic Volume (veh/h)	95	4	64	37	0	60	52	624	105	41	715	148
Future Volume (veh/h)	95	4	64	37	0	60	52	624	105	41	715	148
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
Hourly flow rate (vph)	103	4	70	40	0	65	57	678	114	45	777	161
Approach Volume (veh/h)	177			105			849			983		
Crossing Volume (veh/h)	862			838			152			97		
High Capacity (veh/h)	697			711			1230			1284		
High v/c (veh/h)	0.25			0.15			0.69			0.77		
Low Capacity (veh/h)	547			559			1020			1069		
Low v/c (veh/h)	0.32			0.19			0.83			0.92		
Intersection Summary												
Maximum v/c High	0.77											
Maximum v/c Low	0.92											
Intersection Capacity Utilization	86.2%			ICU Level of Service			E					

Lanes, Volumes, Timings
4: Highway 140 & Forks Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	8	10	4	7	7	579	8	6	611	10
Future Volume (vph)	10	0	8	10	4	7	7	579	8	6	611	10
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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		0.939			0.953				0.850			0.850
Flt Protected		0.973			0.977			0.999			0.999	
Satd. Flow (prot)	0	1599	0	0	1629	0	0	1682	1488	0	1695	1488
Flt Permitted		0.973			0.977			0.999			0.999	
Satd. Flow (perm)	0	1599	0	0	1629	0	0	1682	1488	0	1695	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		1152.3			139.3			1712.9			1313.7	
Travel Time (s)		83.0			10.0			123.3			94.6	
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 (%)	0%	0%	0%	0%	0%	0%	0%	4%	0%	17%	3%	0%
Adj. Flow (vph)	11	0	9	11	4	8	8	629	9	7	664	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	20	0	0	23	0	0	637	9	0	671	11
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	51.9%											
Analysis Period (min)	15											
ICU Level of Service A												

HCM Unsignalized Intersection Capacity Analysis 4: Highway 140 & Forks Road

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	0	8	10	4	7	7	579	8	6	611	10
Future Volume (Veh/h)	10	0	8	10	4	7	7	579	8	6	611	10
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	11	0	9	11	4	8	8	629	9	7	664	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1333	1332	664	1332	1334	629	675			638		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1333	1332	664	1332	1334	629	675			638		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.3		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.4		
p0 queue free %	91	100	98	91	97	98	99			99		
cM capacity (veh/h)	126	153	464	128	153	486	926			878		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	20	23	637	9	671	11						
Volume Left	11	11	8	0	7	0						
Volume Right	9	8	0	9	0	11						
cSH	187	179	926	1700	878	1700						
Volume to Capacity	0.11	0.13	0.01	0.01	0.01	0.01						
Queue Length 95th (m)	2.8	3.5	0.2	0.0	0.2	0.0						
Control Delay (s)	26.5	28.0	0.2	0.0	0.2	0.0						
Lane LOS	D	D	A		A							
Approach Delay (s)	26.5	28.0	0.2		0.2							
Approach LOS	D	D										
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			51.9%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
5: Highway 140 & Concession 3 Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	1	1	3	0	4	4	599	11	7	622	3
Future Volume (vph)	4	1	1	3	0	4	4	599	11	7	622	3
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		15.0	0.0		15.0
Storage Lanes	0		0	0		0	0		1	0		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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			0.923				0.850			0.850
Flt Protected		0.968			0.979						0.999	
Satd. Flow (prot)	0	1655	0	0	1385	0	0	1683	1271	0	1714	1488
Flt Permitted		0.968			0.979						0.999	
Satd. Flow (perm)	0	1655	0	0	1385	0	0	1683	1271	0	1714	1488
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		910.5			2029.2			2151.0			1712.9	
Travel Time (s)		65.6			146.1			154.9			123.3	
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 (%)	0%	0%	0%	33%	0%	0%	0%	4%	17%	0%	2%	0%
Adj. Flow (vph)	4	1	1	3	0	4	4	651	12	8	676	3
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	6	0	0	7	0	0	655	12	0	684	3
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Stop			Stop			Free			Free	
Intersection Summary												
Area Type:	Other											
Control Type:	Unsignalized											
Intersection Capacity Utilization	52.6%											
Analysis Period (min)	15											
	ICU Level of Service A											

HCM Unsignalized Intersection Capacity Analysis 5: Highway 140 & Concession 3 Road

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	1	1	3	0	4	4	599	11	7	622	3
Future Volume (Veh/h)	4	1	1	3	0	4	4	599	11	7	622	3
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
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
Hourly flow rate (vph)	4	1	1	3	0	4	4	651	12	8	676	3
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None						None					
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1355	1363	676	1352	1354	651	679			663		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1355	1363	676	1352	1354	651	679			663		
tC, single (s)	7.1	6.5	6.2	7.4	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.8	4.0	3.3	2.2			2.2		
p0 queue free %	97	99	100	97	100	99	100			99		
cM capacity (veh/h)	126	147	457	107	149	472	923			935		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	6	7	655	12	684	3						
Volume Left	4	3	4	0	8	0						
Volume Right	1	4	0	12	0	3						
cSH	147	192	923	1700	935	1700						
Volume to Capacity	0.04	0.04	0.00	0.01	0.01	0.00						
Queue Length 95th (m)	1.0	0.9	0.1	0.0	0.2	0.0						
Control Delay (s)	30.5	24.4	0.1	0.0	0.2	0.0						
Lane LOS	D	C	A		A							
Approach Delay (s)	30.5	24.4	0.1		0.2							
Approach LOS	D	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			52.6%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	8	6	70	14	21	0	561	59	27	565	32
Future Volume (vph)	29	8	6	70	14	21	0	561	59	27	565	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0		0.0	0.0		0.0	110.0		190.0	55.0		15.0
Storage Lanes	0		0	0		0	1		1	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
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
Ped Bike Factor		1.00			1.00							
Frt		0.980			0.973				0.850			0.850
Flt Protected		0.968			0.968					0.950		
Satd. Flow (prot)	0	1497	0	0	1609	0	1716	1681	1400	1395	1709	1458
Flt Permitted		0.796			0.770					0.383		
Satd. Flow (perm)	0	1230	0	0	1280	0	1716	1681	1400	562	1709	1458
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			16				64			39
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		388.1			2359.9			455.1			2151.0	
Travel Time (s)		27.9			169.9			32.8			154.9	
Confl. Peds. (#/hr)	1					1						
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
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Adj. Flow (vph)	32	9	7	76	15	23	0	610	64	29	614	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	48	0	0	114	0	0	610	64	29	614	35
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.11	1.23	1.11	1.11	1.11	1.11	1.11	1.14	1.17	1.35	1.12	1.11
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2	1	1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0	2.0	2.0	10.0	2.0
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6	2.0	2.0	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lanes, Volumes, Timings
6: Highway 140 & Concession 2 Road

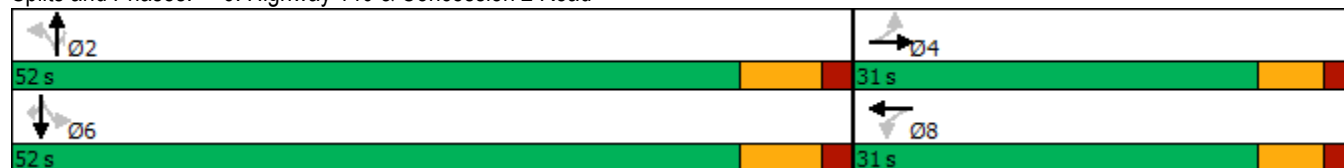
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	4	4		8	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	16.0	16.0		24.0	24.0		22.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	31.0	31.0		31.0	31.0		52.0	52.0	52.0	52.0	52.0	52.0
Total Split (%)	37.3%	37.3%		37.3%	37.3%		62.7%	62.7%	62.7%	62.7%	62.7%	62.7%
Maximum Green (s)	25.0	25.0		25.0	25.0		45.0	45.0	45.0	45.0	45.0	45.0
Yellow Time (s)	4.0	4.0		4.0	4.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		-2.0			-2.0		-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5	4.5	4.5	4.5	4.5
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)				11.0	11.0							
Flash Dont Walk (s)				7.0	7.0							
Pedestrian Calls (#/hr)				0	0							
Act Effct Green (s)		13.6			13.6			52.0	52.0	52.0	52.0	52.0
Actuated g/C Ratio		0.20			0.20			0.75	0.75	0.75	0.75	0.75
v/c Ratio		0.20			0.43			0.48	0.06	0.07	0.48	0.03
Control Delay		22.6			26.6			6.8	1.5	4.6	6.7	1.6
Queue Delay		0.0			0.0			0.0	0.0	0.0	0.0	0.0
Total Delay		22.6			26.6			6.8	1.5	4.6	6.7	1.6
LOS		C			C			A	A	A	A	A
Approach Delay		22.6			26.6			6.3			6.4	
Approach LOS		C			C			A			A	
Queue Length 50th (m)		4.7			11.8			30.6	0.0	1.0	30.5	0.0
Queue Length 95th (m)		13.2			26.0			67.4	3.5	4.2	67.0	2.5
Internal Link Dist (m)		364.1			2335.9			431.1			2127.0	
Turn Bay Length (m)									190.0	55.0		15.0
Base Capacity (vph)		482			507			1258	1064	420	1279	1101
Starvation Cap Reductn		0			0			0	0	0	0	0
Spillback Cap Reductn		0			0			0	0	0	0	0
Storage Cap Reductn		0			0			0	0	0	0	0
Reduced v/c Ratio		0.10			0.22			0.48	0.06	0.07	0.48	0.03
Intersection Summary												
Area Type:	Other											
Cycle Length:	83											
Actuated Cycle Length:	69.5											
Natural Cycle:	55											
Control Type:	Actuated-Uncoordinated											
Maximum v/c Ratio:	0.48											
Intersection Signal Delay:	8.4						Intersection LOS: A					
Intersection Capacity Utilization	47.5%						ICU Level of Service A					

Analysis Period (min) 15

Splits and Phases: 6: Highway 140 & Concession 2 Road



HCM Signalized Intersection Capacity Analysis

6: Highway 140 & Concession 2 Road

TT 2041 (Alternative) PM PH3.syn

12-17-2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	8	6	70	14	21	0	561	59	27	565	32
Future Volume (vph)	29	8	6	70	14	21	0	561	59	27	565	32
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Total Lost time (s)		4.0			4.0			4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Frt		0.98			0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97			1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1496			1608			1681	1400	1395	1709	1458
Flt Permitted		0.80			0.77			1.00	1.00	0.38	1.00	1.00
Satd. Flow (perm)		1230			1280			1681	1400	562	1709	1458
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	9	7	76	15	23	0	610	64	29	614	35
RTOR Reduction (vph)	0	6	0	0	13	0	0	0	18	0	0	10
Lane Group Flow (vph)	0	42	0	0	101	0	0	610	46	29	614	25
Confl. Peds. (#/hr)	1					1						
Bus Blockages (#/hr)	0	20	0	9	0	29	0	5	10	36	1	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.5			9.5			48.2	48.2	48.2	48.2	48.2
Effective Green, g (s)		11.5			11.5			51.2	51.2	51.2	51.2	51.2
Actuated g/C Ratio		0.16			0.16			0.72	0.72	0.72	0.72	0.72
Clearance Time (s)		6.0			6.0			7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0			4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)		200			208			1217	1013	406	1237	1055
v/s Ratio Prot								c0.36			0.36	
v/s Ratio Perm		0.03			c0.08				0.03	0.05		0.02
v/c Ratio		0.21			0.48			0.50	0.05	0.07	0.50	0.02
Uniform Delay, d1		25.7			26.9			4.2	2.8	2.8	4.2	2.7
Progression Factor		1.00			1.00			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.5			1.8			1.5	0.1	0.3	1.4	0.0
Delay (s)		26.2			28.7			5.7	2.9	3.2	5.6	2.8
Level of Service		C			C			A	A	A	A	A
Approach Delay (s)		26.2			28.7			5.4			5.4	
Approach LOS		C			C			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.8										
HCM 2000 Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		70.7										
Intersection Capacity Utilization		47.5%										
Analysis Period (min)		15										
c Critical Lane Group												

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

TT 2041 (Alternative) PM PH3.syn
12-17-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	230	26	12	549	700	117
Future Volume (vph)	230	26	12	549	700	117
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	1	0	0			0
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986				0.981	
Flt Protected	0.957			0.999		
Satd. Flow (prot)	1321	0	0	1674	1631	0
Flt Permitted	0.957			0.999		
Satd. Flow (perm)	1321	0	0	1674	1631	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	250	28	13	597	761	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	278	0	0	610	888	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	69.9%			ICU Level of Service C		
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis 7: Highway 140 & Access Rd

TT 2041 (Alternative) PM PH3.syn
12-17-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	230	26	12	549	700	117
Future Volume (Veh/h)	230	26	12	549	700	117
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	250	28	13	597	761	127
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1448	824	888			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1448	824	888			
tC, single (s)	6.6	6.5	4.3			
tC, 2 stage (s)						
tF (s)	3.7	3.5	2.4			
p0 queue free %	0	92	98			
cM capacity (veh/h)	126	340	675			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	278	610	888			
Volume Left	250	13	0			
Volume Right	28	0	127			
cSH	135	675	1700			
Volume to Capacity	2.06	0.02	0.52			
Queue Length 95th (m)	180.3	0.5	0.0			
Control Delay (s)	557.9	0.5	0.0			
Lane LOS	F	A				
Approach Delay (s)	557.9	0.5	0.0			
Approach LOS	F					
Intersection Summary						
Average Delay		87.5				
Intersection Capacity Utilization		69.9%		ICU Level of Service		C
Analysis Period (min)		15				

Appendix F

Traffic Control Signal Warrant



Signal Justification Calculation for Forecasted Volumes (OTM Book 12 - Justification 7)



Horizon Year: 2041 Total
Region/City/Township: Port Colborne

Major Street: Highway 140
Minor Street: Access Road

North/South?: Y

Number of Approach Lanes: 1
Tee Intersection? Y
Flow Conditions: Free

PM Forecast Only? N

Warrant Results		
150% Satisfied	No	Justification for new intersections with forecast traffic
120% Satisfied	Yes	Justification for existing intersections with forecast traffic

Time Period	Major Street						Minor Street						Peds Crossing
	Highway 140						Access Road						
	Northbound			Southbound			Eastbound			Westbound			
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
AM Peak Hour	22	668	0	0	445	197	78	0	9	0	0	0	0
PM Peak Hour	11	549	0	0	700	104	215	0	24	0	0	0	0
Avg. Hourly Volume	8	304	0	0	286	75	73	0	8	0	0	0	0

Warrant	AHV
1A - All	756
1B - Minor	82
2A - Major	674
2B - Cross	73

Warrant 1 - Minimum Vehicular Volume

1A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
All Approaches		480	720	600	900	756
% Fulfilled						157%

1B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
Minor Street Approaches		180	255	180	255	82
% Fulfilled						45%

Warrant 2 - Delay To Cross Traffic

2A	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
Major Street Approaches		480	720	600	900	674
% Fulfilled						140%

2B	Approach Lanes	1		2 or more		Average Hourly Volume
	Flow Conditions	Free	Restricted	Free	Restricted	
		X				
Traffic Crossing Major Street		50	75	50	75	73
% Fulfilled						147%

Appendix G

Sensitivity Synchro Operational Reports



Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Regional Road 27.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady\2024-11-13

Report generation date: 2024-11-14 1:16:45 PM

Summary of intersection performance

	AM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
Two-Lane Roundabout-Y-Int90 - 2041 Total Traffic Sensitivity							
Leg North	0.03	~1	4.35	0.03	A	7.38	A
Leg West	3.41	5.39	8.08	0.76	A		
Leg South	2.38	3.19	7.67	0.69	A		
Leg East	1.49	1.09	5.91	0.58	A		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - 2041 Total Traffic Sensitivity, AM " model duration: 8:00 AM - 9:30 AM

"D2 - 2041 Total Traffic Sensitivity, PM" model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-14 1:16:45 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Two-Lane Roundabout-Y-Int90 - 2041 Total Traffic Sensitivity, AM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Two-Lane Roundabout-Y-Int90	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2041 Total Traffic Sensitivity, AM	2041 Total Traffic Sensitivity	AM		ONE HOUR	08:00	09:30	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				7.38	A

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Regional Road 27	
South	South	Highway 140	
East	East	Regional Road 27	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	22.40	100.000
West	ONE HOUR	✓	1404.60	100.000
South	ONE HOUR	✓	1027.40	100.000
East	ONE HOUR	✓	829.40	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	14.000	5.600	2.800
	West	5.600	0.000	699.000	700.000
	South	4.200	766.600	0.000	256.600
East	2.800	625.800	200.800	0.000	

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.00	0.63	0.25	0.13
	West	0.00	0.00	0.50	0.50
	South	0.00	0.75	0.00	0.25
	East	0.00	0.75	0.24	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

From	To				
		North	West	South	East
	North	1.000	1.150	1.000	1.000
	West	1.000	1.000	1.110	1.050
	South	1.000	1.060	1.000	1.070
	East	1.000	1.070	1.140	1.000

Truck Percentages - Intersection 1 (for whole period)

From	To				
		North	West	South	East
	North	0.0	15.0	0.0	0.0
	West	0.0	0.0	11.0	5.0
	South	0.0	6.0	0.0	7.0
	East	0.0	7.0	14.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.03	4.35	0.03	~1	A	20.55	30.83	1.88	3.66	0.02	1.88	3.66
West	0.76	8.08	3.41	5.39	A	1288.89	1933.33	183.05	5.68	2.03	183.07	5.68
South	0.69	7.67	2.38	3.19	A	942.76	1414.14	129.04	5.47	1.43	129.05	5.48
East	0.58	5.91	1.49	1.09	A	761.07	1141.61	87.05	4.58	0.97	87.05	4.58

Main Results for each time segment

Main results: (08:00-08:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	16.86	4.22	16.81	9.45	1194.75	0.00	1328.97	395.60	0.013	0.00	0.01	2.986	A
West	1057.46	264.36	1053.03	1054.65	156.91	0.00	2079.27	1843.80	0.509	0.00	1.11	3.770	A
South	773.48	193.37	770.33	678.85	531.09	0.00	1808.76	1487.34	0.428	0.00	0.79	3.672	A
East	624.42	156.10	622.07	719.29	582.13	0.00	1771.86	1380.68	0.352	0.00	0.59	3.392	A

Main results: (08:15-08:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	20.14	5.03	20.12	11.31	1429.98	0.00	1158.91	395.60	0.017	0.01	0.02	3.441	A
West	1262.71	315.68	1260.37	1262.29	187.80	0.00	2056.94	1843.80	0.614	1.11	1.69	4.860	A
South	923.61	230.90	921.97	812.51	635.66	0.00	1733.16	1487.34	0.533	0.79	1.20	4.704	A
East	745.61	186.40	744.56	860.90	696.73	0.00	1689.01	1380.68	0.441	0.59	0.85	4.135	A

Main results: (08:30-08:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	24.66	6.17	24.62	13.82	1748.27	0.00	928.80	395.65	0.027	0.02	0.03	4.334	A
West	1546.49	386.62	1539.85	1543.17	229.72	0.00	2026.64	1843.80	0.763	1.69	3.35	7.871	A
South	1131.19	282.80	1126.62	992.95	776.62	0.00	1631.25	1487.34	0.693	1.20	2.34	7.511	A
East	913.19	228.30	910.71	1051.86	851.38	0.00	1577.21	1380.68	0.579	0.85	1.47	5.842	A

Main results: (08:45-09:00)

Leg	Total Demand	Intersection	Entry Flow	Exit Flow	Circulating	Pedestrian Demand	Capacity	Saturation Capacity	V/C	Start Queue	End Queue	Delay	LOS

	(PCE/hr)	Arrivals (PCE)	(PCE/hr)	(PCE/hr)	Flow (PCE/hr)	(Ped/hr)	(PCE/hr)	(PCE/hr)	Ratio	(PCE)	(PCE)	(s)	
North	24.66	6.17	24.66	13.87	1753.97	0.00	924.68	395.65	0.027	0.03	0.03	4.354	A
West	1546.49	386.62	1546.25	1548.31	230.32	0.00	2026.20	1843.80	0.763	3.35	3.41	8.081	A
South	1131.19	282.80	1131.03	996.73	779.84	0.00	1628.92	1487.34	0.694	2.34	2.38	7.675	A
East	913.19	228.30	913.13	1056.16	854.72	0.00	1574.79	1380.68	0.580	1.47	1.49	5.907	A

Main results: (09:00-09:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	20.14	5.03	20.18	11.38	1438.14	0.00	1153.00	395.60	0.017	0.03	0.02	3.459	A
West	1262.71	315.68	1269.40	1269.64	188.68	0.00	2056.30	1843.80	0.614	3.41	1.74	4.978	A
South	923.61	230.90	928.21	817.88	640.21	0.00	1729.87	1487.34	0.534	2.38	1.23	4.798	A
East	745.61	186.40	748.08	866.97	701.44	0.00	1685.60	1380.68	0.442	1.49	0.87	4.181	A

Main results: (09:15-09:30)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	16.86	4.22	16.89	9.51	1201.81	0.00	1323.86	395.60	0.013	0.02	0.01	3.000	A
West	1057.46	264.36	1059.91	1060.93	157.77	0.00	2078.65	1843.80	0.509	1.74	1.13	3.820	A
South	773.48	193.37	775.20	683.12	534.56	0.00	1806.25	1487.34	0.428	1.23	0.80	3.714	A
East	624.42	156.10	625.51	723.94	585.81	0.00	1769.20	1380.68	0.353	0.87	0.60	3.423	A

Queueing Delay Results for each time segment

Queueing Delay results: (08:00-08:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.21	0.01	2.986	A	A
West	16.10	1.07	3.770	A	A
South	11.50	0.77	3.672	A	A
East	8.61	0.57	3.392	A	A

Queueing Delay results: (08:15-08:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.28	0.02	3.441	A	A
West	24.56	1.64	4.860	A	A
South	17.48	1.17	4.704	A	A
East	12.49	0.83	4.135	A	A

Queueing Delay results: (08:30-08:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.44	0.03	4.334	A	A
West	47.00	3.13	7.871	A	A
South	33.17	2.21	7.511	A	A
East	21.25	1.42	5.842	A	A

Queueing Delay results: (08:45-09:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.45	0.03	4.354	A	A
West	50.85	3.39	8.081	A	A
South	35.46	2.36	7.675	A	A
East	22.21	1.48	5.907	A	A

Queueing Delay results: (09:00-09:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.30	0.02	3.459	A	A
West	27.19	1.81	4.978	A	A
South	19.12	1.27	4.798	A	A

East	13.39	0.89	4.181	A	A

Queueing Delay results: (09:15-09:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.21	0.01	3.000	A	A
West	17.35	1.16	3.820	A	A
South	12.30	0.82	3.714	A	A
East	9.11	0.61	3.423	A	A

Queue Variation Results for each time segment

Queue Variation results: (08:00-08:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.11	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.79	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	0.59	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:15-08:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.69	0.00	0.00	3.24	5.39			N/A	N/A
South	1.20	0.00	0.00	2.12	3.19			N/A	N/A
East	0.85	0.00	0.00	0.00	1.09			N/A	N/A

Queue Variation results: (08:30-08:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.35	0.00	0.00	0.00	5.39			N/A	N/A
South	2.34	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.47	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (08:45-09:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	3.41	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	2.38	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.49	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:00-09:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker

North	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.74	0.00	0.00	3.24	4.32			N/A	N/A
South	1.23	0.00	0.00	1.06	2.12			N/A	N/A
East	0.87	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (09:15-09:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.01	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.13	0.00	0.00	2.16	3.24			N/A	N/A
South	0.80	0.00	0.00	1.06	1.06			N/A	N/A
East	0.60	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Junctions 8
ARCADY 8 - Roundabout Module
Version: 8.0.6.541 [19821,26/11/2015] © Copyright TRL Limited, 2024
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Filename: Highway 140 & Regional Road 27.arc8

Path: C:\Users\AdamMorrison\OneDrive - Paradigm\Desktop\Project\Personal Project Files\230726-Arcady\2024-11-13

Report generation date: 2024-11-14 1:17:30 PM

Summary of intersection performance

	PM						
	Queue (PCE)	95% Queue (PCE)	Delay (s)	V/C Ratio	LOS	Intersection Delay (s)	Intersection LOS
Two-Lane Roundabout-Y-Int90 - 2041 Total Traffic Sensitivity							
Leg North	0.05	~1	6.30	0.04	A	14.54	B
Leg West	8.51	30.16	18.17	0.90	C		
Leg South	2.79	4.22	9.08	0.73	A		
Leg East	5.08	16.72	14.50	0.84	B		

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle. Intersection LOS and Intersection Delay are demand-weighted averages.

"D1 - 2041 Total Traffic Sensitivity, AM" model duration: 8:00 AM - 9:30 AM

"D2 - 2041 Total Traffic Sensitivity, PM " model duration: 4:30 PM - 6:00 PM

Run using Junctions 8.0.6.541 at 2024-11-14 1:17:30 PM

File summary

Title	(untitled)
Location	
Site Number	
Date	2024-10-29
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Analyst	AdamMorrison
Description	

Analysis Options

Vehicle Length (m)	Do Queue Variations	Calculate Residual Capacity	Residual Capacity Criteria Type	V/C Ratio Threshold	Average Delay Threshold (s)	Queue Threshold (PCE)
7.50	✓		N/A	0.85	36.00	20.00

Units

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	Total Delay Units	Rate Of Delay Units
m	kph	PCE	PCE	perHour	s	-Min	perMin

Two-Lane Roundabout-Y-Int90 - 2041 Total Traffic Sensitivity, PM

Data Errors and Warnings

No errors or warnings

Analysis Set Details

Name	Roundabout Capacity Model	Description	Include In Report	Use Specific Demand Set(s)	Specific Demand Set (s)	Locked	Network Flow Scaling Factor (%)	Network Capacity Scaling Factor (%)	Reason For Scaling Factors
Two-Lane Roundabout-Y-Int90	ARCADY		✓				100.000	100.000	

Demand Set Details

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Results For Central Hour Only	Single Time Segment Only	Locked	Run Automatically	Use Relationship	Relationship
2041 Total Traffic Sensitivity, PM	2041 Total Traffic Sensitivity	PM		ONE HOUR	16:30	18:00	90	15				✓		

Intersection Network

Intersections

Intersection	Name	Intersection Type	Leg Order	Grade Separated	Large Roundabout	Do Geometric Delay	Intersection Delay (s)	Intersection LOS
1	(untitled)	Roundabout	North,West,South,East				14.54	B

Intersection Network Options

Driving Side	Lighting
Right	Normal/unknown

Legs

Legs

Leg	Leg	Name	Description
North	North	Highway 140	
West	West	Regional Road 27	
South	South	Highway 140	
East	East	Regional Road 27	

Capacity Options

Leg	Minimum Capacity (PCE/hr)	Maximum Capacity (PCE/hr)	Assume Flat Start Profile	Initial Queue (PCE)
North	0.00	99999.00		0.00
West	0.00	99999.00		0.00
South	0.00	99999.00		0.00
East	0.00	99999.00		0.00

Roundabout Geometry

Leg	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
North	7.00	8.00	30.00	20.00	55.00	25.00	
West	7.00	8.00	30.00	20.00	55.00	25.00	
South	7.00	8.00	30.00	20.00	55.00	25.00	
East	7.00	8.00	30.00	20.00	55.00	25.00	

Slope / Intercept / Capacity

Leg Intercept Adjustments

Leg	Type	Reason	Direct Intercept Adjustment (PCE/hr)	Percentage Intercept Adjustment (%)
North	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
West	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
South	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00
East	Percentage	Region of Waterloo Capacity Guideline - <10 Years		90.00

Roundabout Slope and Intercept used in model

Leg	Enter slope and intercept directly	Entered slope	Entered intercept (PCE/hr)	Final Slope	Final Intercept (PCE/hr)
North		(calculated)	(calculated)	0.723	2192.710
West		(calculated)	(calculated)	0.723	2192.710
South		(calculated)	(calculated)	0.723	2192.710
East		(calculated)	(calculated)	0.723	2192.710

The slope and intercept shown above include any corrections and adjustments.

Traffic Flows

Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCE Factor for a Truck (PCE)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		✓	✓	Truck Percentages	2.00				✓	✓

Entry Flows

General Flows Data

Leg	Profile Type	Use Turning Counts	Average Demand Flow (PCE/hr)	Flow Scaling Factor (%)
North	ONE HOUR	✓	25.20	100.000
West	ONE HOUR	✓	1613.80	100.000
South	ONE HOUR	✓	1025.40	100.000
East	ONE HOUR	✓	1187.00	100.000

Turning Proportions

Turning Counts / Proportions (PCE/hr) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.000	22.400	2.800	0.000
	West	15.400	0.000	800.400	798.000
	South	4.200	771.600	0.000	249.600
	East	5.600	910.000	271.400	0.000

Turning Proportions (PCE) - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.00	0.89	0.11	0.00
	West	0.01	0.00	0.50	0.49
	South	0.00	0.75	0.00	0.24
	East	0.00	0.77	0.23	0.00

Vehicle Mix

Average PCE Per Vehicle - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	1.000	1.080	1.000	1.000
	West	1.050	1.000	1.040	1.040
	South	1.000	1.050	1.000	1.070
	East	1.000	1.050	1.030	1.000

Truck Percentages - Intersection 1 (for whole period)

	To				
From		North	West	South	East
	North	0.0	8.0	0.0	0.0
	West	5.0	0.0	4.0	4.0
	South	0.0	5.0	0.0	7.0
	East	0.0	5.0	3.0	0.0

Results

Results Summary for whole modelled period

Leg	Max V/C Ratio	Max Delay (s)	Max Queue (PCE)	Max 95th percentile Queue (PCE)	Max LOS	Average Demand (PCE/hr)	Total Intersection Arrivals (PCE)	Total Queueing Delay (PCE-min)	Average Queueing Delay (s)	Rate Of Queueing Delay (PCE-min/min)	Inclusive Total Queueing Delay (PCE-min)	Inclusive Average Queueing Delay (s)
North	0.04	6.30	0.05	~1	A	23.12	34.69	2.78	4.80	0.03	2.78	4.80
West	0.90	18.17	8.51	30.16	C	1480.85	2221.28	352.87	9.53	3.92	352.90	9.53
South	0.73	9.08	2.79	4.22	A	940.92	1411.39	144.16	6.13	1.60	144.17	6.13
East	0.84	14.50	5.08	16.72	B	1089.21	1633.82	227.09	8.34	2.52	227.11	8.34

Main Results for each time segment

Main results: (16:30-16:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	18.97	4.74	18.90	18.88	1463.61	0.00	1134.59	400.76	0.017	0.00	0.02	3.453	A
West	1214.95	303.74	1208.93	1277.06	205.45	0.00	2044.18	1934.78	0.594	0.00	1.51	4.451	A
South	771.97	192.99	768.68	805.05	609.34	0.00	1752.19	1487.70	0.441	0.00	0.82	3.848	A
East	893.64	223.41	889.38	784.91	593.11	0.00	1763.93	1365.63	0.507	0.00	1.06	4.282	A

Main results: (16:45-17:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	22.65	5.66	22.62	22.59	1751.41	0.00	926.53	400.76	0.024	0.02	0.03	4.263	A
West	1450.77	362.69	1446.36	1528.20	245.83	0.00	2014.99	1934.78	0.720	1.51	2.61	6.534	A
South	921.81	230.45	919.95	963.19	729.01	0.00	1665.68	1487.70	0.553	0.82	1.29	5.079	A
East	1067.09	266.77	1064.19	939.13	709.82	0.00	1679.55	1365.63	0.635	1.06	1.79	6.084	A

Main results: (17:00-17:15)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	27.75	6.94	27.66	27.46	2133.87	0.00	650.03	400.76	0.043	0.03	0.05	6.192	A
West	1776.83	444.21	1755.72	1862.43	299.10	0.00	1976.48	1934.78	0.899	2.61	7.89	15.653	C
South	1128.99	282.25	1123.30	1169.89	884.93	0.00	1552.95	1487.70	0.727	1.29	2.71	8.721	A
East	1306.91	326.73	1294.71	1141.61	866.62	0.00	1566.19	1365.63	0.834	1.79	4.84	13.300	B

Main results: (17:15-17:30)

Leg	Total Demand	Intersection	Entry Flow	Exit Flow	Circulating	Pedestrian Demand	Capacity	Saturation Capacity	V/C	Start Queue	End Queue	Delay	LOS

	(PCE/hr)	Arrivals (PCE)	(PCE/hr)	(PCE/hr)	Flow (PCE/hr)	(Ped/hr)	(PCE/hr)	(PCE/hr)	Ratio	(PCE)	(PCE)	(s)	
North	27.75	6.94	27.74	27.72	2149.11	0.00	639.01	400.76	0.043	0.05	0.05	6.303	A
West	1776.83	444.21	1774.32	1875.17	301.68	0.00	1974.61	1934.78	0.900	7.89	8.51	18.167	C
South	1128.99	282.25	1128.67	1181.70	894.31	0.00	1546.17	1487.70	0.730	2.71	2.79	9.078	A
East	1306.91	326.73	1305.96	1152.11	870.86	0.00	1563.12	1365.63	0.836	4.84	5.08	14.500	B

Main results: (17:30-17:45)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	22.65	5.66	22.74	22.96	1772.85	0.00	911.03	400.76	0.025	0.05	0.03	4.338	A
West	1450.77	362.69	1473.79	1546.14	249.44	0.00	2012.38	1934.78	0.721	8.51	2.76	7.236	A
South	921.81	230.45	927.62	980.40	742.83	0.00	1655.68	1487.70	0.557	2.79	1.34	5.256	A
East	1067.09	266.77	1079.92	954.57	715.89	0.00	1675.16	1365.63	0.637	5.08	1.87	6.453	A

Main results: (17:45-18:00)

Leg	Total Demand (PCE/hr)	Intersection Arrivals (PCE)	Entry Flow (PCE/hr)	Exit Flow (PCE/hr)	Circulating Flow (PCE/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCE/hr)	Saturation Capacity (PCE/hr)	V/C Ratio	Start Queue (PCE)	End Queue (PCE)	Delay (s)	LOS
North	18.97	4.74	19.01	19.04	1474.94	0.00	1126.40	400.76	0.017	0.03	0.02	3.481	A
West	1214.95	303.74	1219.80	1286.80	207.15	0.00	2042.95	1934.78	0.595	2.76	1.54	4.576	A
South	771.97	192.99	773.98	812.14	614.82	0.00	1748.23	1487.70	0.442	1.34	0.84	3.904	A
East	893.64	223.41	896.76	791.58	597.22	0.00	1760.95	1365.63	0.507	1.87	1.09	4.368	A

Queueing Delay Results for each time segment

Queueing Delay results: (16:30-16:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.27	0.02	3.453	A	A
West	21.70	1.45	4.451	A	A
South	12.01	0.80	3.848	A	A
East	15.41	1.03	4.282	A	A

Queueing Delay results: (16:45-17:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.39	0.03	4.263	A	A
West	37.15	2.48	6.534	A	A
South	18.76	1.25	5.079	A	A
East	25.73	1.72	6.084	A	A

Queueing Delay results: (17:00-17:15)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.69	0.05	6.192	A	A
West	99.98	6.67	15.653	C	B
South	38.03	2.54	8.721	A	A
East	64.30	4.29	13.300	B	B

Queueing Delay results: (17:15-17:30)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.72	0.05	6.303	A	A
West	123.86	8.26	18.167	C	B
South	41.46	2.76	9.078	A	A
East	74.75	4.98	14.500	B	B

Queueing Delay results: (17:30-17:45)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.42	0.03	4.338	A	A
West	46.15	3.08	7.236	A	A
South	20.97	1.40	5.256	A	A

East	30.08	2.01	6.453	A	A

Queueing Delay results: (17:45-18:00)

Leg	Queueing Total Delay (PCE-min)	Queueing Rate Of Delay (PCE-min/min)	Average Delay Per Arriving Vehicle (s)	Unsignalised Level Of Service	Signalised Level Of Service
North	0.28	0.02	3.481	A	A
West	24.03	1.60	4.576	A	A
South	12.92	0.86	3.904	A	A
East	16.82	1.12	4.368	A	A

Queue Variation Results for each time segment

Queue Variation results: (16:30-16:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.51	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
South	0.82	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	1.06	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A

Queue Variation results: (16:45-17:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.61	0.00	0.00	5.20	9.36			N/A	N/A
South	1.29	0.00	0.00	2.11	3.16			N/A	N/A
East	1.79	0.00	0.00	3.14	5.23			N/A	N/A

Queue Variation results: (17:00-17:15)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	7.89	0.00	0.00	15.60	30.16			N/A	N/A
South	2.71	0.00	0.00	0.00	4.22			N/A	N/A
East	4.84	0.00	0.00	5.23	16.72			N/A	N/A

Queue Variation results: (17:15-17:30)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.05	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	8.51	0.00	0.00	7.28	28.08			N/A	N/A
South	2.79	?	?	?	?	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
East	5.08	0.00	0.00	1.05	10.45			N/A	N/A

Queue Variation results: (17:30-17:45)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.03	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	2.76	0.00	0.00	5.20	9.36			N/A	N/A
South	1.34	0.00	0.00	2.11	3.16			N/A	N/A
East	1.87	0.00	0.00	4.18	6.27			N/A	N/A

Queue Variation results: (17:45-18:00)

Leg	Mean (PCE)	Q05 (PCE)	Q50 (PCE)	Q90 (PCE)	Q95 (PCE)	Percentile Message	Marker Message	Probability Of Reaching Or Exceeding Marker	Probability Of Exactly Reaching Marker
North	0.02	~1	~1	~1	~1	Percentiles could not be calculated. This may be because the mean queue is very small or very big.		N/A	N/A
West	1.54	0.00	0.00	2.08	5.20			N/A	N/A
South	0.84	0.00	0.00	1.05	2.11			N/A	N/A
East	1.09	0.00	0.00	1.05	3.14			N/A	N/A

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

AM - Total (2041) Sens
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	51	54	138	668	445	109
Future Volume (vph)	51	54	138	668	445	109
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	55.0			85.0
Storage Lanes	1	0	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.930					0.850
Flt Protected	0.976		0.950			
Satd. Flow (prot)	1271	0	1330	1620	1562	1190
Flt Permitted	0.976		0.483			
Satd. Flow (perm)	1271	0	676	1620	1562	1190
Right Turn on Red	Yes				Yes	
Satd. Flow (RTOR)	54					118
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	55	59	150	726	484	118
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	150	726	484	118
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1		1	2	2	1
Detector Template	Left		Left	Thru	Thru	Right
Leading Detector (m)	2.0		2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0		2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	

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Lanes, Volumes, Timings
7: Highway 140 & Access Rd

AM - Total (2041) Sens
Nyon Marine Fuelling Corp Phase 1 TIS

	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4		2			6
Detector Phase	4		2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	15.0	15.0
Minimum Split (s)	23.0		23.9	23.9	23.9	23.9
Total Split (s)	25.0		65.0	65.0	65.0	65.0
Total Split (%)	27.8%		72.2%	72.2%	72.2%	72.2%
Maximum Green (s)	18.0		57.1	57.1	57.1	57.1
Yellow Time (s)	5.0		5.9	5.9	5.9	5.9
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0		7.9	7.9	7.9	7.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effect Green (s)	9.2		39.2	39.2	39.2	39.2
Actuated g/C Ratio	0.16		0.68	0.68	0.68	0.68
v/c Ratio	0.46		0.33	0.66	0.46	0.14
Control Delay	22.1		9.3	12.4	8.7	1.7
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	22.1		9.3	12.4	8.7	1.7
LOS	C		A	B	A	A
Approach Delay	22.1			11.9	7.4	
Approach LOS	C			B	A	
Queue Length 50th (m)	5.2		7.3	50.1	26.7	0.0
Queue Length 95th (m)	24.6		22.1	114.5	60.5	5.5
Internal Link Dist (m)	162.0			1294.9	785.0	
Turn Bay Length (m)			55.0			85.0
Base Capacity (vph)	458		619	1485	1432	1100
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.25		0.24	0.49	0.34	0.11
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 58						
Natural Cycle: 65						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.66						
Intersection Signal Delay: 10.9	Intersection LOS: B					
Intersection Capacity Utilization 63.6%	ICU Level of Service B					
Analysis Period (min) 15						

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Lanes, Volumes, Timings
7: Highway 140 & Access Rd

AM - Total (2041) Sens
Nyon Marine Fuelling Corp Phase 1 TIS

Splits and Phases: 7: Highway 140 & Access Rd

HCM Signalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

AM - Total (2041) Sens
Nyon Marine Fuelling Corp Phase 1 TIS

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	51	54	138	668	445	109
Future Volume (vph)	51	54	138	668	445	109
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0		7.9	7.9	7.9	7.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	0.98		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1272		1330	1620	1562	1190
Flt Permitted	0.98		0.48	1.00	1.00	1.00
Satd. Flow (perm)	1272		677	1620	1562	1190
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	59	150	726	484	118
RTOR Reduction (vph)	47	0	0	0	0	45
Lane Group Flow (vph)	67	0	150	726	484	73
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4		2			6
Actuated Green, G (s)	7.4		36.8	36.8	36.8	36.8
Effective Green, g (s)	7.4		36.8	36.8	36.8	36.8
Actuated g/C Ratio	0.13		0.62	0.62	0.62	0.62
Clearance Time (s)	7.0		7.9	7.9	7.9	7.9
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159		421	1008	972	740
v/s Ratio Prot			c0.45	0.31		
v/s Ratio Perm	c0.05		0.22			0.06
v/c Ratio	0.42		0.36	0.72	0.50	0.10
Uniform Delay, d1	23.9		5.4	7.6	6.1	4.5
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.8		0.5	2.6	0.4	0.1
Delay (s)	25.7		5.9	10.2	6.5	4.5
Level of Service	C		A	B	A	A
Approach Delay (s)	25.7			9.5	6.1	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay		9.4		HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio		0.67				
Actuated Cycle Length (s)		59.1		Sum of lost time (s)		14.9
Intersection Capacity Utilization		63.6%		ICU Level of Service		B
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

PM - Total (2041) - Sens
Nyon Marine Fueling Corp Phase 1 TIS

	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	101	155	71	549	700	58
Future Volume (vph)	101	155	71	549	700	58
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	55.0			85.0
Storage Lanes	1	0	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.918					0.850
Flt Protected	0.981		0.950			
Satd. Flow (prot)	1261	0	1330	1683	1716	1190
Flt Permitted	0.981		0.215			
Satd. Flow (perm)	1261	0	301	1683	1716	1190
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	86					63
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	110	168	77	597	761	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	278	0	77	597	761	63
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1		1	2	2	1
Detector Template	Left		Left	Thru	Thru	Right
Leading Detector (m)	2.0		2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0		2.0	0.6	0.6	2.0
Detector 1 Type	CI+Ex		CI+Ex	CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				CI+Ex	CI+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	

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Lanes, Volumes, Timings
7: Highway 140 & Access Rd

PM - Total (2041) - Sens
Nyon Marine Fueling Corp Phase 1 TIS

	↖	↗	↖	↗	↖	↗
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4		2			6
Detector Phase	4		2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	15.0	15.0
Minimum Split (s)	23.0		23.9	23.9	23.9	23.9
Total Split (s)	33.0		57.0	57.0	57.0	57.0
Total Split (%)	36.7%		63.3%	63.3%	63.3%	63.3%
Maximum Green (s)	26.0		49.1	49.1	49.1	49.1
Yellow Time (s)	5.0		5.9	5.9	5.9	5.9
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0		7.9	7.9	7.9	7.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effect Green (s)	16.6		35.3	35.3	35.3	35.3
Actuated g/C Ratio	0.24		0.52	0.52	0.52	0.52
v/c Ratio	0.75		0.50	0.69	0.86	0.10
Control Delay	31.3		24.8	17.4	26.0	3.1
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	31.3		24.8	17.4	26.0	3.1
LOS	C		C	B	C	A
Approach Delay	31.3			18.3	24.2	
Approach LOS	C			B	C	
Queue Length 50th (m)	23.2		6.0	53.4	79.1	0.0
Queue Length 95th (m)	59.2		23.5	109.0	#165.2	5.6
Internal Link Dist (m)	162.0			1289.7	789.2	
Turn Bay Length (m)			55.0			85.0
Base Capacity (vph)	574		224	1254	1278	902
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.48		0.34	0.48	0.60	0.07
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 68.2						
Natural Cycle: 65						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.86						
Intersection Signal Delay: 23.1	Intersection LOS: C					
Intersection Capacity Utilization 87.9%	ICU Level of Service E					
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						

PTSL (200364)

Synchro 11 Report
Page 2

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

PM - Total (2041) - Sens
Nyon Marine Fueling Corp Phase 1 TIS

Queue shown is maximum after two cycles.

Splits and Phases: 7: Highway 140 & Access Rd

 Ø2  Ø6  Ø2  Ø6	 Ø4  Ø4  Ø4  Ø4

HCM Signalized Intersection Capacity Analysis
7: Highway 140 & Access Rd

PM - Total (2041) - Sens
Nyon Marine Fueling Corp Phase 1 TIS

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	101	155	71	549	700	58
Future Volume (vph)	101	155	71	549	700	58
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0		7.9	7.9	7.9	7.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.92		1.00	1.00	1.00	0.85
Flt Protected	0.98		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1261		1330	1683	1716	1190
Flt Permitted	0.98		0.21	1.00	1.00	1.00
Satd. Flow (perm)	1261		301	1683	1716	1190
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	168	77	597	761	63
RTOR Reduction (vph)	65	0	0	0	0	30
Lane Group Flow (vph)	213	0	77	597	761	33
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4		2			6
Actuated Green, G (s)	16.6		35.3	35.3	35.3	35.3
Effective Green, g (s)	16.6		35.3	35.3	35.3	35.3
Actuated g/C Ratio	0.25		0.53	0.53	0.53	0.53
Clearance Time (s)	7.0		7.9	7.9	7.9	7.9
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	313		159	889	906	628
v/s Ratio Prot			0.35	c0.44		
v/s Ratio Perm	c0.17		0.26			0.03
v/c Ratio	0.68		0.48	0.67	0.84	0.05
Uniform Delay, d1	22.7		10.0	11.5	13.4	7.6
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0		2.3	2.0	6.9	0.0
Delay (s)	28.7		12.3	13.5	20.3	7.7
Level of Service	C		B	B	C	A
Approach Delay (s)	28.7			13.4	19.3	
Approach LOS	C			B	B	
Intersection Summary						
HCM 2000 Control Delay		18.5		HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio		0.79				
Actuated Cycle Length (s)		66.8		Sum of lost time (s)		14.9
Intersection Capacity Utilization		87.9%		ICU Level of Service		E
Analysis Period (min)		15				
c Critical Lane Group						

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

Sensitivity 2041 (Alternative) AM PH3.syn

12-17-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	94	11	25	668	445	222
Future Volume (vph)	94	11	25	668	445	222
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	55.0			85.0
Storage Lanes	1	0	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986					0.850
Flt Protected	0.957		0.950			
Satd. Flow (prot)	1321	0	1330	1620	1562	1190
Flt Permitted	0.957		0.476			
Satd. Flow (perm)	1321	0	666	1620	1562	1190
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6					241
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1318.9	809.0	
Travel Time (s)	13.4			95.0	58.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Adj. Flow (vph)	102	12	27	726	484	241
Shared Lane Traffic (%)						
Lane Group Flow (vph)	114	0	27	726	484	241
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1		1	2	2	1
Detector Template	Left		Left	Thru	Thru	Right
Leading Detector (m)	2.0		2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0		2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

Sensitivity 2041 (Alternative) AM PH3.syn

12-17-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4		2			6
Detector Phase	4		2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	15.0	15.0
Minimum Split (s)	23.0		23.9	23.9	23.9	23.9
Total Split (s)	25.0		65.0	65.0	65.0	65.0
Total Split (%)	27.8%		72.2%	72.2%	72.2%	72.2%
Maximum Green (s)	18.0		57.1	57.1	57.1	57.1
Yellow Time (s)	5.0		5.9	5.9	5.9	5.9
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0		7.9	7.9	7.9	7.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	10.9		40.9	40.9	40.9	40.9
Actuated g/C Ratio	0.18		0.67	0.67	0.67	0.67
v/c Ratio	0.47		0.06	0.67	0.46	0.28
Control Delay	32.0		6.6	13.5	9.5	1.9
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	32.0		6.6	13.5	9.5	1.9
LOS	C		A	B	A	A
Approach Delay	32.0			13.2	7.0	
Approach LOS	C			B	A	
Queue Length 50th (m)	10.3		1.2	55.9	29.9	0.0
Queue Length 95th (m)	33.9		4.9	123.1	65.1	8.1
Internal Link Dist (m)	162.0			1294.9	785.0	
Turn Bay Length (m)			55.0			85.0
Base Capacity (vph)	424		599	1457	1405	1094
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.27		0.05	0.50	0.34	0.22
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 61.1						
Natural Cycle: 65						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.67						
Intersection Signal Delay: 11.7				Intersection LOS: B		
Intersection Capacity Utilization 57.0%				ICU Level of Service B		
Analysis Period (min) 15						

Splits and Phases: 7: Highway 140 & Access Rd



HCM Signalized Intersection Capacity Analysis

7: Highway 140 & Access Rd

Sensitivity 2041 (Alternative) AM PH3.syn

12-17-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	94	11	25	668	445	222
Future Volume (vph)	94	11	25	668	445	222
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0		7.9	7.9	7.9	7.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1321		1330	1620	1562	1190
Flt Permitted	0.96		0.48	1.00	1.00	1.00
Satd. Flow (perm)	1321		667	1620	1562	1190
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	12	27	726	484	241
RTOR Reduction (vph)	5	0	0	0	0	92
Lane Group Flow (vph)	109	0	27	726	484	149
Heavy Vehicles (%)	25%	25%	25%	8%	12%	25%
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4		2			6
Actuated Green, G (s)	8.9		38.3	38.3	38.3	38.3
Effective Green, g (s)	8.9		38.3	38.3	38.3	38.3
Actuated g/C Ratio	0.14		0.62	0.62	0.62	0.62
Clearance Time (s)	7.0		7.9	7.9	7.9	7.9
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	189		411	999	963	733
v/s Ratio Prot				c0.45	0.31	
v/s Ratio Perm	c0.08		0.04			0.12
v/c Ratio	0.58		0.07	0.73	0.50	0.20
Uniform Delay, d1	24.8		4.8	8.3	6.6	5.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2		0.1	2.7	0.4	0.1
Delay (s)	29.0		4.8	10.9	7.0	5.3
Level of Service	C		A	B	A	A
Approach Delay (s)	29.0			10.7	6.5	
Approach LOS	C			B	A	
Intersection Summary						
HCM 2000 Control Delay			10.1	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.70			
Actuated Cycle Length (s)			62.1	Sum of lost time (s)		14.9
Intersection Capacity Utilization			57.0%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

Sensitivity 2041 (Alternative) PM PH3.syn

12-17-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	230	26	12	549	700	117
Future Volume (vph)	230	26	12	549	700	117
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Storage Length (m)	0.0	0.0	55.0			85.0
Storage Lanes	1	0	1			1
Taper Length (m)	7.5		7.5			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.986					0.850
Flt Protected	0.957		0.950			
Satd. Flow (prot)	1321	0	1330	1683	1716	1190
Flt Permitted	0.957		0.199			
Satd. Flow (perm)	1321	0	279	1683	1716	1190
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)	6					127
Link Speed (k/h)	50			50	50	
Link Distance (m)	186.0			1313.7	813.2	
Travel Time (s)	13.4			94.6	58.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Adj. Flow (vph)	250	28	13	597	761	127
Shared Lane Traffic (%)						
Lane Group Flow (vph)	278	0	13	597	761	127
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.11	1.11	1.11
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1		1	2	2	1
Detector Template	Left		Left	Thru	Thru	Right
Leading Detector (m)	2.0		2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0		0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0		2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	

Lanes, Volumes, Timings
7: Highway 140 & Access Rd

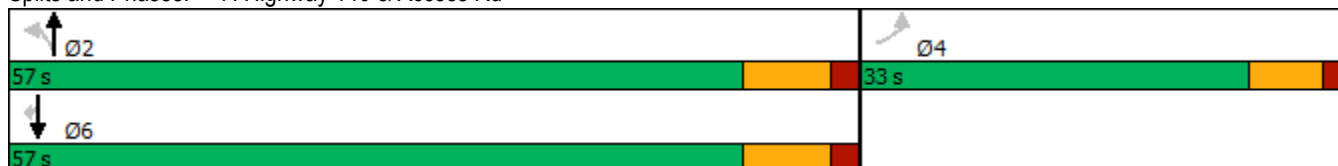
Sensitivity 2041 (Alternative) PM PH3.syn

12-17-2024

						
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Permitted Phases	4		2			6
Detector Phase	4		2	2	6	6
Switch Phase						
Minimum Initial (s)	6.0		15.0	15.0	15.0	15.0
Minimum Split (s)	23.0		23.9	23.9	23.9	23.9
Total Split (s)	33.0		57.0	57.0	57.0	57.0
Total Split (%)	36.7%		63.3%	63.3%	63.3%	63.3%
Maximum Green (s)	26.0		49.1	49.1	49.1	49.1
Yellow Time (s)	5.0		5.9	5.9	5.9	5.9
All-Red Time (s)	2.0		2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0		7.9	7.9	7.9	7.9
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Recall Mode	None		Min	Min	Min	Min
Walk Time (s)	5.0		5.0	5.0	5.0	5.0
Flash Dont Walk (s)	11.0		11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0		0	0	0	0
Act Effct Green (s)	19.9		37.3	37.3	37.3	37.3
Actuated g/C Ratio	0.27		0.51	0.51	0.51	0.51
v/c Ratio	0.77		0.09	0.69	0.87	0.19
Control Delay	41.2		11.7	18.8	28.3	2.8
Queue Delay	0.0		0.0	0.0	0.0	0.0
Total Delay	41.2		11.7	18.8	28.3	2.8
LOS	D		B	B	C	A
Approach Delay	41.2			18.7	24.6	
Approach LOS	D			B	C	
Queue Length 50th (m)	37.4		0.9	62.7	92.8	0.0
Queue Length 95th (m)	#80.8		4.3	109.0	#165.2	7.8
Internal Link Dist (m)	162.0			1289.7	789.2	
Turn Bay Length (m)			55.0			85.0
Base Capacity (vph)	503		196	1185	1208	875
Starvation Cap Reductn	0		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.55		0.07	0.50	0.63	0.15
Intersection Summary						
Area Type:	Other					
Cycle Length: 90						
Actuated Cycle Length: 73.1						
Natural Cycle: 70						
Control Type: Actuated-Uncoordinated						
Maximum v/c Ratio: 0.87						
Intersection Signal Delay: 25.2				Intersection LOS: C		
Intersection Capacity Utilization 68.0%				ICU Level of Service C		
Analysis Period (min) 15						
# 95th percentile volume exceeds capacity, queue may be longer.						

Queue shown is maximum after two cycles.

Splits and Phases: 7: Highway 140 & Access Rd



HCM Signalized Intersection Capacity Analysis

7: Highway 140 & Access Rd

Sensitivity 2041 (Alternative) PM PH3.syn

12-17-2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	230	26	12	549	700	117
Future Volume (vph)	230	26	12	549	700	117
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Total Lost time (s)	7.0		7.9	7.9	7.9	7.9
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	1322		1330	1683	1716	1190
Flt Permitted	0.96		0.20	1.00	1.00	1.00
Satd. Flow (perm)	1322		279	1683	1716	1190
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	28	13	597	761	127
RTOR Reduction (vph)	4	0	0	0	0	61
Lane Group Flow (vph)	274	0	13	597	761	66
Heavy Vehicles (%)	25%	25%	25%	4%	2%	25%
Turn Type	Perm		Perm	NA	NA	Perm
Protected Phases				2	6	
Permitted Phases	4		2			6
Actuated Green, G (s)	19.9		37.3	37.3	37.3	37.3
Effective Green, g (s)	19.9		37.3	37.3	37.3	37.3
Actuated g/C Ratio	0.28		0.52	0.52	0.52	0.52
Clearance Time (s)	7.0		7.9	7.9	7.9	7.9
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	364		144	870	887	615
v/s Ratio Prot				0.35	c0.44	
v/s Ratio Perm	c0.21		0.05			0.06
v/c Ratio	0.75		0.09	0.69	0.86	0.11
Uniform Delay, d1	23.8		8.8	13.0	15.1	8.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5		0.3	2.3	8.3	0.1
Delay (s)	32.3		9.1	15.3	23.4	9.0
Level of Service	C		A	B	C	A
Approach Delay (s)	32.3			15.2	21.3	
Approach LOS	C			B	C	
Intersection Summary						
HCM 2000 Control Delay			20.9	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.82			
Actuated Cycle Length (s)			72.1	Sum of lost time (s)		14.9
Intersection Capacity Utilization			68.0%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						