

## **Technical Memo**

Date: January 23, 2023 Our Reference # 477916

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Subject: Transportation Study - Metrolinx's Guelph Existing Level Rail Crossings - Existing Conditions

**Technical Memorandum** 

## 1 Overview

Parsons has been retained by the City of Guelph (the City) to determine the transportation infrastructure needs to support the planned GO Regional Express Rail (RER) service, which may be needed due to Metrolinx's ongoing review of potential changes to five (5) existing level rail crossings (LRCs) at Alma Street, Edinburgh Road, Yorkshire Street, Glasgow Street and Watson Road. A feasibility of an active transportation connection across the rail track at Cityview Drive will also be conducted.

This memo presents the inventory of the existing transportation infrastructure including road network, intersections and types of control, transit network, active transportation facilities, and the level crossings. Observed impact of the train shunting operations on traffic flow along Edinburgh Road is also discussed. Finally, an assessment conducted using Synchro software, of intersection operations including the level crossings' operations is presented. A site visit was conducted on November 11, 2021 from 7:30 AM to 10:00 AM, to observe the rail crossing operations, on-street parking, confirm lane configurations, intersection control and operations. The memo also presents the relevant site visit findings under respective sections of the document.

Two separate study areas Study Area A and B have been established as shown in **Figure 1-1**. The memo discusses the study areas under two separate sections, the first describing Study Area A and the second describing Study Area B.

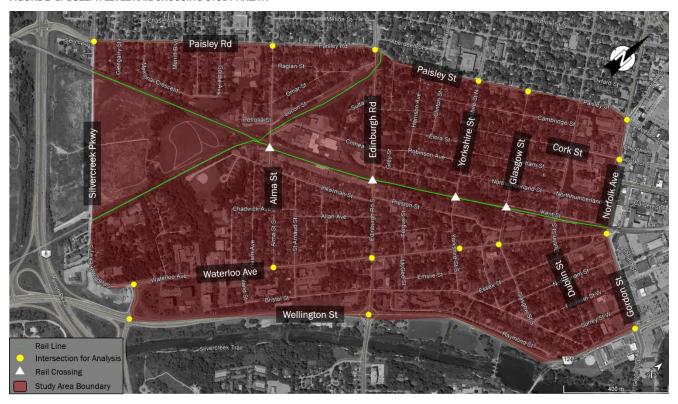
### FIGURE 1-1. STUDY AREAS



## 2 Study Area A

Study Area A is bounded by Paisley Road to the north, Wellington Street to the south, Norfolk Street to the east, and Silvercreek Parkway to the west. **Figure 2-1** below illustrates the study area road network, the intersections included in the analysis and the level rail crossings.

FIGURE 2-1: GUELPH LEVEL RAIL CROSSING STUDY AREA A



## 2.1 Existing Road Network

The existing road network within Study Area A consists of arterial, collector and local roads, as described in the Schedule 5 of the City of Guelph's Official Plan.

### Paisley Street/Road

It is an east-west arterial road with two-lane cross-section in the study area, named as Paisley Road west of Edinburgh Road and Paisley Street to the east. Paisley Street is primarily surrounded by residential land uses within the study area and has a posted speed limit of 50 km/h. There are also several schools, religious institutions, and commercial plazas along Paisley Street/Road. On-street parking is restricted within the study area except for north side of the segment from Norfolk Avenue and Dublin Street.

## Waterloo Avenue

Waterloo Avenue is an east-west road with two-lane cross-section within the study area serving mixed residential and commercial land uses. West of Edinburgh Road, Waterloo Avenue is classified as a collector road and as an arterial to the east of Edinburg Road. Waterloo Avenue has a current speed limit of 50 km/h. During the site visit it was found that near the Guelph Montessori School a reduced speed limit of 40 km/h is effective when beacons are flashing. On-street parking is not permitted on Waterloo Avenue except the south side from Yorkshire Street to Dublin Street where the parking is allowed during night from 6 pm to 8 am.

## Wellington Street

Wellington Street is a major east-west arterial road with four-lane cross-section within the study area. It is an access-controlled road with no driveway accesses west of Dublin Street, however driveways are provided east of Dublin Street where Wellington Street serves the commercial land-uses. Wellington Street has a posted speed limit of 60 km/h throughout the study area.



Bike lanes and sidewalks are provided westerly from approximately 300m east of the intersection at Waterloo Avenue. No sidewalks and bike lanes are available easterly up to Dublin Street. Sidewalks only are available east of Dublin Street.

## Norfolk Street/Gordon Street

Norfolk Street is a north-south arterial road with two-lane cross-section between Paisley Street and Waterloo Avenue. Norfolk Street serves primarily commercial land uses in the central business district area of Guelph, with some onstreet parking permitted on the east side between Cork Street and Macdonell Street. At signalized intersections along Norfolk Street, left-turn lanes are provided. The posted speed limit is 50 km/h.

Gordon Street is the continuation of Norfolk Street south of Waterloo Avenue, which offers four-lane cross-section in the north-south direction. Gordon Street also provides access to industrial and commercial land use.

#### Silvercreek Parkway

Silvercreek Parkway is a two-lane north-south road parallel to Hanlon Expressway. Within the study area, it is classified as a collector road. South of Paisley Road, Silvercreek Parkway is discontinuous at CNR/Metrolinx rail track. In the absence of a posted speed limit, it is assumed that Silvercreek Parkway operates at 50 km/h.

## Edinburgh Road

Edinburgh Road is a two-lane north-south arterial road providing access primarily to residential land uses. It has a posted speed limit of 50 km/h with left-turning lanes at signalized intersections. Within the study area, there are two at-grade rail crossings along Edinburgh Road; the first located south of Paisley Road supporting freight rail and related shunting operations, and the second located further south between Foster Avenue and Preston Street, supporting CNR, Metrolinx and VIA rail operations.

### Alma Street

Alma Street is a two-lane north-south local road providing access to primarily residential and commercial land uses. Alma Street has two rail crossings approximately 70m apart between Inkerman Street and Lucan Street. The south crossing is the main CNR and Metrolinx corridor protected with automatic gates and flashing lights. The north crossing serves freight and shunting operations and has no gate. The posted speed limit is 50 km/h.

#### Yorkshire Street

Yorkshire Street is a two-lane collector road running north-south through the study area and serves primarily residential land use. On-street parking is restricted on the east side except on Sundays. In the absence of a posted speed limit, it is assumed that Yorkshire Street operates at 50 km/h. Approximately 200m north of Waterloo Avenue, Yorkshire Street has an at-grade rail crossing across CNR and Metrolinx track with automatic gates and flashing lights.

## **Glasgow Street**

Glasgow Street is a two-lane local road providing access to residential properties. On-street parking is restricted except for 2:00 AM to 6:00 AM on the east side, however a significant number of parked cars were observed during the site visit. Approximately 150 meters north of Waterloo Avenue, Glasgow Street has an at-grade crossing CNR and Metrolinx track with automatic gates and flashing lights. In the absence of a posted speed limit, it is assumed that Glasgow Street operates at 50 km/h.

## **Dublin Street**

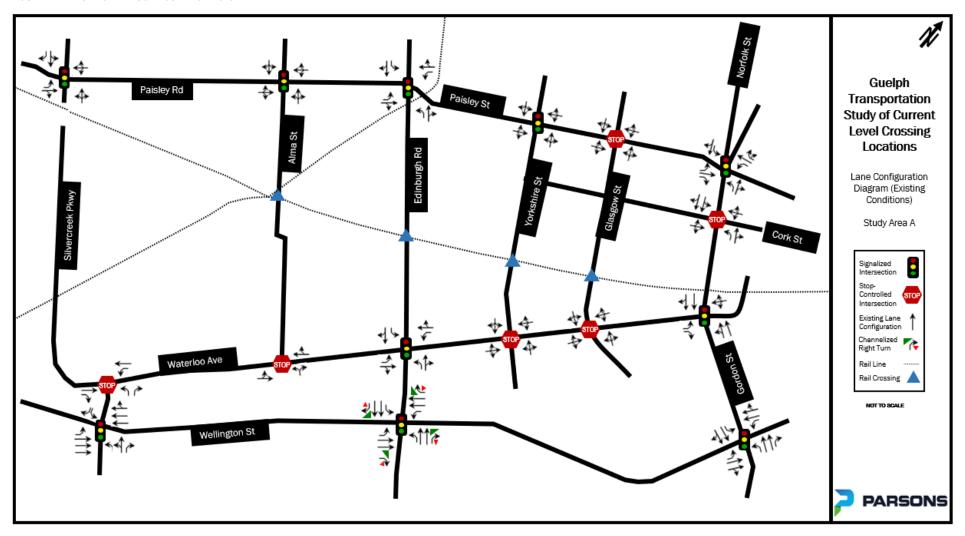
Dublin Street is a two-lane local road running north-south through the study area with sidewalks on both sides of the road. Dublin Street provides access to residential properties and has a speed limit of 50 km/h throughout the corridor except for the immediate area around Central Public School, where the posted speed limit is 30 km/h.

The Dublin Street at-grade rail crossing is currently closed. On-street parking is restricted.

A diagram illustrating the lane configuration at each of the intersections selected for analysis is presented below in **Figure 2-2**.



FIGURE 2-2: EXISTING LANE CONFIGURATION - STUDY AREA A





## 2.2 Active Transportation Network

Within Study Area A, there are several streets which currently contain bike lanes or paved shoulder cycling facilities including Waterloo Avenue, Norfolk Street, and a section of Paisley Street between Edinburgh Road and Glasgow Street. The existing signed bicycle route on Yorkshire Street connects the Old City neighbourhood to the city-wide bike network through bike lanes on Waterloo Avenue and Paisley Street. West of Edinburgh Road, a local bike route on Alma Street provides the north-south connectivity between Waterloo Avenue and Paisley Street.

There are also multiple roadways where active transportation network improvements are proposed as shown in **Figure 2-3**. Bike lanes are proposed along Edinburgh Road and Paisley Street west of Edinburgh Road to Silvercreek Parkway. On-road bike lanes proposed along Silvercreek Parkway, which is also proposed to be part of the Spine Cycling Network.

Almost all streets in the study area have a sidewalk on both sides of the road, except for small portions of Alma Street, Yorkshire Street and Norfolk Street. Silvercreek Parkway has no sidewalk on either side of the road. It was observed during the site visit that sidewalks are not properly marked separately from the road pavement at the LRCs. A continuous asphalt surface with vertical edges, as shown in **Figure 2-4**, is provided which is unsafe for vulnerable road users. During the site visit a significant pedestrian activity was observed along Yorkshire Street and Alma Street. Waterloo Avenue and Yorkshire Street intersection, and Paisley Road and Alma Street intersection were notably the hub of active transportation users within the study area.

**Table 2-1**- provides details of the existing active transportation facilities available along the streets within the Study Area A.

Willow

Suffolk

Paisley

Down to will be a secondary

Plan

Water

Multi-use Path or Cycle Track

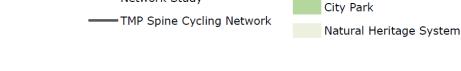
Wellington Trails and Active Transportation Routes

Bike Lane or Route

(Existing/Planned)

Secondary Plan Area

FIGURE 2-3: EXISTING AND PROPOSED ACTIVE TRANSPORTATION NETWORK (FIGURE SOURCE: MAP 3 OF THE GUELPH TRAIL MASTER PLAN - MAY 2021)



Planned Trail

detailed review

Network Study

Existing Trail

Desired Connection; route

subject to change upon

Active Transportation



FIGURE 2-4: SIDEWALK CONDITION ACROSS LRCs









TABLE 2-1: EXISTING CYCLING AND PEDESTRIAN FACILITIES - STUDY AREA A

Street	Cycling Facilities	Sidewalks
Paisley Street/Road	<ul> <li>Bicycle lanes on both sides from Edinburgh Road to Glasgow Street.</li> <li>From Norfolk Street and Dublin Street bike lane is available on the south side only. The north side is used for on-street parking.</li> <li>No bike lanes from Dublin Street to Glasgow Street and west of Edinburgh Road.</li> </ul>	Available on both sides
Waterloo Avenue	<ul> <li>Bicycle lanes on both sides of the street.</li> <li>Included in the Spine Cycling Network.</li> </ul>	<ul> <li>Available on both sides</li> <li>Pedestrian signals at intersections of Yorkshire Street and Dublin Street.</li> </ul>
Wellington Street	Bike lanes available westerly from approximately 300m east of the intersection at Waterloo Avenue.	<ul> <li>Sidewalks available westerly from approximately 300m east of the intersection at Waterloo Avenue.</li> <li>No sidewalks available easterly up to Dublin Street.</li> </ul>



Street	Cycling Facilities	Sidewalks
	No bike lanes available easterly within the study area.	
Norfolk/Gordon Street	<ul><li>Bike lanes available on both sides.</li><li>Included in the Spine Cycling Network</li></ul>	Available on both sides
Alma Street	<ul><li>Identified as a local cycling route.</li><li>Bikes travel within mixed traffic.</li></ul>	<ul> <li>Sidewalks available on both sides</li> <li>Exist only on the east side for a small segment near the rail crossings.</li> </ul>
Yorkshire Street	<ul><li>A signed cycling route.</li><li>Bikes travel within mixed traffic.</li></ul>	<ul><li>Available on both sides</li><li>Pedestrian signals at intersection of Waterloo Avenue</li></ul>
Glasgow Street	No bike lanes	Available on both sides
Dublin Street	No bike lanes	<ul><li>Available on both sides</li><li>Pedestrian signals at intersection of Waterloo Avenue</li></ul>

## 2.3 Transit Network

Given that the Guelph Central Station is near the eastern limit of Study Area A, there are several transit routes that operate in the vicinity. The following describe the rail and local transit operations within the study area.

## 2.3.1 RAIL TRANSIT

The City has provided the rail service schedule of Guelph Central Station as of September 4, 2021. Metrolinx now operates 10 eastbound trains and 10 westbound trains each weekday between 5:00 AM – 12:00 AM at Guelph Central Station for the route between Kitchener GO and Toronto Union GO Stations. In addition, VIA rail operates one eastbound train and one westbound train 7 days a servicing Guelph Central Station. The schedule is given in **Table 2-2** below.

From review of the traffic data discussed further below, it reveals that the AM and PM peak periods generally happen from 8:00 AM to 9:00 AM and from 4:30 PM to 5:30 PM, respectively. This implies that in general two eastbound trains during the AM peak hour and two westbound trains during the PM peak hour are likely to pass through the study area.

TABLE 2-2: TRAIN SCHEDULE - GUELPH CENTRAL STATION

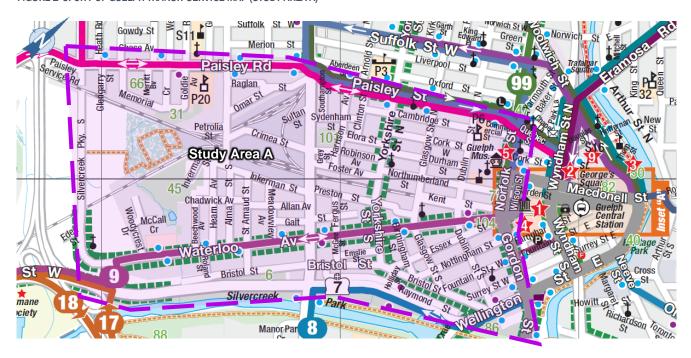
	Eastbo	ound	Westbound				
	GO Trains (Weekdays)	VIA Rail (All days)	GO Trains (Weekdays)	VIA Rail (All days)			
•	05:30 06:23 06:53 07:23 07:53 08:23 09:00 12:00	09:44	<ul> <li>11:04</li> <li>14:04</li> <li>17:04</li> <li>17:41</li> <li>18:11</li> <li>18:41</li> <li>19:11</li> <li>19:41</li> </ul>	18:51			
•	15:02 21:00		• 23:04 • 0:04				



## 2.3.2 LOCAL TRANSIT

The Guelph Transit operates multiple bus routes in the study areas shown in **Figure 2-5**. The transit service map was retrieved from the Guelph Transit's full system map on their website on October 17, 2021. The residents of the study area can access the transit along Paisley Road/Street, Waterloo Avenue and Norflok/Gordon Street.

FIGURE 2-5: CITY OF GUELPH TRANSIT SERVICE MAP (STUDY AREA A)



## 9 Waterloo

The 9 Waterloo bus route operates in the east-west direction along Waterloo Avenue, connecting to the Guelph Central Station. Throughout the day, including the peak hours, the headway for this route is 30 minutes (2 buses/hour).

## 10 Imperial

The 10 Imperial bus route operates in the east-west direction from the Guelph Central Station along Paisley Road. Within the study area, the route has stops at Norfolk Street, east of Dublin Street, Glasgow Street, Yorkshire Street, Edinburgh Street, and Alma Street. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

### 11 Willow West

The 11 Willow West bus route operates in the east west direction between Guelph Central Station and Silvercreek Parkway via Paisley Street and Edinburgh Road. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

## 20 Northwest Industrial

The 20 Northwest Industrial bus route operates along Paisley Street and Edinburgh Road in the eastbound direction. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

## 99 Mainline

The route operates in the north-south direction with a stop at Norfolk Street and Cork Street and a stop at Gordon Street and Wellington Avenue. During the peak hour, the headway for this route is 10 minutes (6 buses/hour).



## 2.4 Level Rail Crossings

### 2.4.1 LOCATIONS

Study Area A includes four level rail crossings defined for this transportation study. These are summarized in **Table 2-3** below. The locations are shown in **Figure 2-1**. The level rail crossing at Dublin Street is closed.

TABLE 2-3: RAIL CROSSING LOCATIONS - STUDY AREA A

Street	Location	Traffic Control and Warning System
Alma Street	between Crimea Street and Inkerman Street	<ul> <li>South Crossing - Automatic Gates, Warning Signals &amp; Bells</li> <li>North Crossing - Warning Signals &amp; Bells</li> </ul>
Edinburgh Road	between Foster Avenue and Preston Street	Automatic Gates, Warning Signals & Bells
Yorkshire Street	between Foster Avenue and Preston Street	Automatic Gates, Warning Signals & Bells
Glasgow Street	Glasgow Street at Kent Street	Automatic Gates, Warning Signals & Bells

#### 2.4.2 SHUNTING OPERATIONS

CN Railway uses the northerly level crossings at Edinburgh Road and Alma Street for its switching operations. The crossings are shown in **Figure 2-2**. These crossings are not used by Metrolinx and are not included in the scope of this study, however, at times the queues at these crossings extend up to and beyond the Metrolinx crossing especially at Edinburgh Road and resultantly impact the Metrolinx' crossing traffic operations. Switching operations are random, therefore the City recorded the switching patterns and associated disruptions to traffic flow, from August 19, 2021 to September 30, 2021. During the site visit on November 11, 2021, there was no switching taking place and the following is the list of the observations and related information provided by the City.

- Switching operations do not happen during the PM peak hour but do happen during the AM peak hour
- As per Transport Canada regulations, the warning signals can operate for maximum up to 5 minutes at one time and as such a crossing cannot be blocked for more than 5 minutes continuously.
- When the switching time is more than 5 minutes, a crossing needs to be occupied multiple times but not exceeding 5 minutes at a time.
- The crossings were observed to be occupied for more than 5 minutes at several instances with blockages occurring up to 15 minutes at one time.
- Even when the crossings are cleared intermittently, mostly the bells and lights remained activated for as long as up to 60 minutes.
- Within intermittent openings, light traffic crossed but the school buses were not permitted to cross an
  activated crossing unless given signal to cross by the train crew.
- Normally 6-10 school buses were observed to be stuck in traffic but at one occasion 14 busses were observed to be stuck on Edinburgh Road and 9 buses on Paisley Road.
- Blockage of Alma Street has minimal impact to traffic however at several occasions the northbound queues
  at Edinburgh Road were observed to be extending southerly beyond the Metrolinx crossing up to Inkerman
  Street, approximately 500m long. The southbound queues were observed to be approximately 400m long.
  reaching up to London Road.
- Few instances of drivers jumping the queue and having a near miss by the train were also observed.

Although it was not recorded in the field observations, however traffic infiltration to adjacent residential streets is very likely to avoid the queues. Such additional traffic creates safety concerns for the kids and their parents walking to respective schools during the morning hours.

## 2.4.3 COLLISION HISTORY

A review of historical collision data from the past 6 years (2016 to 2021) was undertaken for each LRCs within 50m of the respective crossing. The purpose of the review was to determine if there are any discernable collision trends



that would require consideration during the feasibility study process. The collisions data was provided by the City and is included in **Appendix A. Table 2-4** summarizes the number of collisions and the types.

The crossings experienced five (5) or fewer collisions over the last six (6) years. There are no patterns revealed except at Edinburg LRC where all five (5) collisions are of the rear end impact type. It is not uncommon for drivers inside a queue following too closely the driver in front of them during busy traffic periods. If the vehicle in front of them suddenly decides to stop there is very little time to avoid a rear end collision. This observation is consistent with the impacts of the shunting operations noted above that result in significantly long queues interfering with the Metrolinx crossing. Also as discussed further below in **Section 2.7**, significantly long queues occur because of Metrolinx crossing itself as well.

TABLE 2-4: HISTORICAL COLLISIONS FROM 2016 TO 2021.

Data	Alma Street Crossing	Edinburgh Street Crossing	Yorkshire Street Crossing	Glasgow Street Crossing					
	Classification								
Fatal	0		-						
Non-fatal Injury	1	1	-						
Property Damage Only	1	4	-	No Collisions					
Non-reportable	-		1						
Total	2	5	1						
	In	npact Type							
Single Motor Vehicle	1	-	-						
Turning Movement	1	-	-						
Rear End	-	5	-	No Collisions					
Other	-	-	1						
Total	2	5	1						

## 2.5 Existing Traffic Data

## 2.5.1 TURNING MOVEMENT COUNTS

A total of 16 intersections including 10 signalized and 6 unsignalized intersections within Study Area A as shown in **Figure 2-2**, were selected in consultation with the City for traffic analysis in Synchro. Parsons collected fresh traffic data in September 2021. However, a comparison of the fresh data with the pre-Covid TMCs provided by the City revealed that the traffic is not yet at the pre-Covid level. It was therefore decided in consultation with the City staff to use the pre-Covid data for a conservative analysis. Intersections along with their count dates and sources are listed in **Table 2-5.** The data used in the analysis is shown in **bold dates**.

The old data provided by the City for the unsignalized intersection of Yorkshire Street at Waterloo Avenue was collected during the Covid pandemic in October 2020. The fresh data collected in September 2021 is higher than the old data. For the unsignalized intersections of Alma Street at Waterloo Avenue, and Norfolk Street at Cork Street, historic traffic counts were not available. Therefore, for these three intersections the fresh data from September 2021 has been used. The standard industry practice of volume balancing has been employed to adjust the TMCs of these intersections with the adjacent intersections having the old data. The balanced AM and PM peak hour TMCs are included in **Appendix B**. The TMCs data sheets are also provided in **Appendix B**.



TABLE 2-5: INTERSECTIONS DATA SOUIRCE AND COUNT DTAES - STUDY AREA A

	Intersection	Data Source	Count Date
Signaliz	ed Intersections		
1	Edinburgh Rd and Paisley Rd/Paisley St.	Parsons City of Guelph	14-Sep-2021 <b>27-Mar-2019</b>
2	Edinburgh Rd and Waterloo Ave.	Parsons City of Guelph	14-Sep-2021 <b>13-Feb-2018</b>
3	Edinburgh Rd and Wellington St.	Parsons City of Guelph	14-Sep-2021 <b>19-Jul-2018</b>
4	Norfolk St./Gordon St. and Waterloo Ave/Wilson St.	Parsons City of Guelph	14-Sep-2021 <b>02-Oct-2018</b>
5	Gordon St. and Wellington St.	Parsons City of Guelph	14-Sep-2021 <b>29-Oct-2015</b>
6	Paisley Rd. and Silvercreek Pkwy.	Parsons City of Guelph	14-Sep-2021 13-Feb-2018
7	Yorkshire St. and Paisley St.	Parsons City of Guelph	<b>14-Sep-2021</b> 27-Mar-2019
8	Waterloo Ave. and Wellington St.	Parsons City of Guelph	14-Sep-2021 <b>13-Feb-2018</b>
9	Alma St. and Paisley Rd.	Parsons City of Guelph	14-Sep-2021 <b>13-Feb-2018</b>
10	Norfolk St. and Paisley St./Quebec St.	Parsons City of Guelph	14-Sep-2021 <b>24-Jul-2018</b>
Unsign	alized Intersections		
11	Yorkshire St. and Waterloo Ave.	Parsons City of Guelph	<b>14-Sep-2021</b> 07-Oct-2020
12	Norfolk St. and Cork St.	Parsons	14-Sep-2021
13	Glasgow St. and Paisley St.	Parsons City of Guelph	<b>14-Sep-2021</b> 02-Oct-2018
14	Glasgow St. and Waterloo Ave.	Parsons City of Guelph	<b>14-Sep-2021</b> 02-Oct-2018
15	Silvercreek Pkwy. and Waterloo Ave.	Parsons City of Guelph	14-Sep-2021 <b>13-Feb-2018</b>
16	Alma St. and Waterloo Ave.	Parsons	14-Sep-2021

## 2.5.2 24 HOUR ATR DATA - LEVEL RAIL CROSSINGS

Parsons collected 24-hour Automatic Traffic Recorder (ATR) 24-hour volume counts for 7 days from September 17 to September 23, 2021, at all the level rail crossings included in this study. The City also provided ATR data for rail crossings at Alma Street, Yorkshire Street and Glasgow Street which were collected from September 28 to October 04, 2020. **Table 2-6** compares the Annual Average Daily Traffic (AADT) and the two-way peak hour volumes from 2020 and 2021 data. The data is comparable and therefore the greater of the two data for the respective crossings were used for rail crossings traffic operations analysis being conservative. The ATR data is provided in **Appendix B**.



**TABLE 2-6: ATR DATA AT RAIL CROSSINGS** 

Data		Street ssing	Edinburgh Street Crossing		Yorkshire Street Crossing				_	w Street ssing
			AADT							
AADT 2020	18	17	Not Av	ailable	13	62	12	99		
AADT 2021	17	39	12814		1290		1331			
		P	eak Hour							
	AM	PM	AM	PM	AM	PM	AM	PM		
2020 Peak hour	227	303	Not Av	ailable	179	177	145	156		
2021 Peak hour	216	253	920	1301	316	213	171	156		

As discussed earlier, pre-Covid TMCs have been used for the intersection operations analyses however no pre-Covid data was available for the rail crossings. Therefore, to estimate the pre-Covid rail crossings volumes, the AM and PM peak hour volumes at the rail crossings were adjusted/balanced within 10% of the respective approach volumes of nearest intersection as per standard industry practice. The balanced rail crossings' peak hour volumes are provided in **Appendix B** along with the balanced TMCs.

As a result of the Dublin LRC closure in July 2021, the traffic was diverted to Glasgow Street and Yorkshire Street. The review of the ATR data reveals that Yorkshire Street has higher traffic volume than that on Glasgow Street.

## 2.5.3 PEDESTRIAN AND BICYCLE COUNTS - LEVEL RAIL CROSSINGS

The City provided pedestrian and bicycle the weekend and weekday counts at the rail crossings which were collected on various dates in September and October 2021 from 6:00 AM to 12:00 AM. The weekday counts were collected on Tuesdays and Wednesdays and the weekend counts on Saturdays and Sundays. **Table 2-7** summarizes the pedestrian and bicycle volumes including dates at the rail crossings. The data sheets are provided in **Appendix B**.

Except Alma Street crossing the weekend volumes are higher for all the crossings. The overall peak hour is mostly observed during the PM periods. The Glasgow Street crossing experiences higher pedestrian and bicycle demand than that on Yorkshire Street. On Saturday, the bicycle volume on Yorkshire Street is very high due to "Bike the Night" event and as such do not represent the normal bicycle demand for the street. From the data sheets, there were 155 bikes recorded during 8 - 8:15 PM period. If these are excluded as an outlier, the total volume on Saturday calculates to 396. The peak bicycle volume and the total volume would be 6 and 28, respectively.

TABLE 2-7: PEDESTRIAN AND BICYCLE VOLUME AT RAIL CROSSINGS

Data Type	Alma Street Crossing		Edinburgh Street Crossing		Yorkshire Street Crossing		Glasgow Street Crossing	
		,	Neekday					
	Tue (Sep 7, 2021)	Wed (Oct 13, 2021)	Tue (Sep 21, 2021)	Wed (Sep 22, 2021)	Tue (Sep 21, 2021)	Wed (Sep 22, 2021)	Tue (Sep 14, 2021)	Wed (Sep 15, 2021)
Total Volume		<u> </u>						
Pedestrians	381	478	197	141	306	229	375	417
Bicycles	108	104	41	22	37	16	62	108
Total	489	582	238	163	343	245	437	525
Peak Hour Volume	8 - 9 AM	2:30 - 3:30 PM	3 - 4 PM	3 - 4 PM	3 - 4 PM	2:45 - 3:45 PM	8 - 9 AM	8 - 9 AM
Pedestrians	119	100	37	20	57	47	66	66



Data Type	Data Type Alma Street Crossing Edinburgh Street Crossing		Yorkshire Street Crossing		Glasgow Street Crossing			
		1	Neekday					
	Tue (Sep 7, 2021)	Wed (Oct 13, 2021)	Tue (Sep 21, 2021)	Wed (Sep 22, 2021)	Tue (Sep 21, 2021)	Wed (Sep 22, 2021)	Tue (Sep 14, 2021)	Wed (Sep 15, 2021)
Bicycles	9	12	4	2	8	6	12	12
Total	128	112	41	22	65	53	78	78
		,	Veekend					
	Sat (Sep 4, 2021)	Sun (Sep 5, 2021)	Sat (Sep 18, 2021)	Sun (Sep 19, 2021)	Sat (Sep 18, 2021)	Sun (Sep 19, 2021)	Sat (Sep 11, 2021)	Sun (Sep 12, 2021)
Total Volume								
Pedestrians	214	276	325	253	271	307	462	239
Bicycles	139	85	108	87	280	100	75	65
Total	353	361	433	340	551	407	537	304
Peak Hour Volume	3 - 4 PM	6:15 - 7:15 PM	6:45 - 7:45 PM	4:15 - 5:15 PM	7:15 - 8:15 PM	7 - 8 PM	9:15 - 10:15 AM	6:45 - 7:45 PM
Pedestrians	24	38	44	32	22	41	58	32
Bicycles	19	4	7	12	161	9	6	2
Total	43	42	51	44	183	50	64	34

## 2.6 Intersection Operations

The traffic analysis conducted for this study considers the capacity and level of service for intersections. Intersections were analyzed using the procedures of the Highway Capacity Manual (HCM) methodologies for signalized and unsignalized intersections, as implemented in the Synchro 10 software.

Level of Service (LOS) can be characterized for each intersection approach and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay and volume-to-capacity (V/C) ratio are used to characterize LOS for a lane group. Delay quantifies the variations in travel time due to traffic signal control. It is also a surrogate measure of driver discomfort and fuel consumption. The volume-to-capacity (V/C) ratio quantifies the degree to which the capacity of each signal phase is utilized by a defined lane group. **Table 2-8** summarizes the characteristics of each level of service at signalized intersections.

TABLE 2-8: SIGNALIZED INTERSECTION LEVEL OF SERVICE CHARACTERISTICS

Level Service	Features	Control delay (sec/veh)
А	Describes operations with very low control delay, up to 10 seconds/ vehicle. This level of service occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all at this LOS. Short cycle lengths may also contribute to low delay.	≤ 10
В	Describes operations with control delay greater than 10 seconds and up to 20 seconds /vehicle.  This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop at this level than at LOS A, causing longer average delays.	> 10 to 20
С	Describes operations with control delay greater than 20 seconds and up to 35 seconds/vehicle.  These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.	> 20 to 35
D	Describes operations with control delay greater than 35 seconds and up to 55 seconds/vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavourable progression, long cycle lengths, or high V/C ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures become noticeable.	> 35 to 55



Level Service	Features	Control delay (sec/veh)
E	Describes operations with control delay greater than 55 seconds and up to 80 seconds/vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55 to 80
F	LOS F describes operations with control delay more than 80 seconds/vehicle. This oversaturation, considered to be unacceptable to most drivers, occurs when arrival flow rates exceed the design capacity of the intersection. It may al so occur at high V/C ratios below 1.0 with m any individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors to such high delay levels.	> 80

Source: Highway Capacity Manual (HCM) 2000

The LOS criteria for unsignalized intersections are somewhat different from the criteria for signalized intersections because perceptions of facility users differ. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will present greater delay than an unsignalized intersection. Unsignalized intersections are also associated with more uncertainty for users, as delays are less predictable than at signalized junctions. This uncertainty can reduce driver's delay tolerance. **Table 2-9** summarizes the characteristics of each level of service at unsignalized intersections.

TABLE 2-9: UNSIGNALIZED INTERSECTION LEVEL OF SERVICE CHARACTERISTICS

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
А	Little or no delays	0 < Delay ≤ 10
В	Short traffic delays	10 < Delay ≤ 15
С	Average traffic delays	15 < Delay ≤ 25
D	Long traffic delays	25 < Delay ≤ 35
E	Very long traffic delays	35 < Delay ≤ 50
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	Delay > 50

Source: Highway Capacity Manual (HCM) 2000

The following two subsections presents the summary of intersection operations under the existing traffic conditions.

## 2.6.1 SIGNALIZED INTERSECTIONS

A summary of the Synchro results for the signalized intersection operations is presented in **Table 2-10**. Detailed Synchro reports are provided in **Appendix C**. The intersections and the movements with LOS 'F' as well as the queues exceeding the existing storage length are identified in red font. All intersections are operating acceptably with adequate residual capacity except the Wellington Street and Gordon Street intersection which is over capacity during both the AM and PM peak hours. The southbound left (SBL) movement at this intersection exceeds capacity with the queues exceeding the available storage length during both the AM and PM peak hours. During the PM peak hour, the westbound through-right movement is also constrained at this intersection, while approaching capacity during the AM peak hour.

The shared northbound through-right and the shared southbound through-right movements are shown to be approaching capacity at the Edinburgh Road and Paisley Street intersection.



TABLE 2-10: SIGNALIZED INTERSECTION ANALYSIS (EXISTING CONDITIONS) - STUDY AREA A

				AN	/I Peal	( Hour							PIV	l Peak	Hour			
Intersection		Overall				Mov	ements				Overall				Move	ments		
intersection	V/C	Delay	LOS		V/C	Delay	LOS	Queu	e (m)	V/C	Delay	LOS	D!	V/C	Delay	LOS	Queu	e (m)
	V/C	(s)	LUS	Dir	V/C	(s)	LUS	50th	95th	V/C	(s)	LUS	Dir	V/C	(s)	LUS	50th	95th
				EBL	0.55	14	В	14	25				EBL	0.73	18	В	16	59
Paisley St. &				EBTR	0.40	13	В	30	49				EBTR	0.37	9	Α	28	52
Silvercreek	0.58	20	В	WBLTR		26	С	53	86	0.77	22	С	WBLTR	0.82	29	С	76	137
Parkway				NBLTR	0.00	18 24	B C	0 21	1 39				NBLTR	0.01	22 33	C	0 30	2 49
				SBLT	0.44	19	В	0	11				SBLT	0.71	23	С	0	16
				EBL	0.70	59	E	39	59				EBL	0.70	61	E	38	59
				EBT	0.25	5	Α	22	36				EBT	0.24	8	Α	27	40
				WBTR	0.28	13	В	34	54				WBTR	0.41	19	В	57	83
Waterloo Ave &	0.41	25	С	NBL	0.62	55	D	34	52	0.54	27	С	NBL	0.75	54	D	64	87
Wellington St.	0.41	23		NBLT	0.62	54	D	36	54	0.54	27	C	NBLT	0.74	53	D	65	88
				NBR	0.53	51	D	22	46				NBR	0.10	39	D	0	15
				SBL	0.01	45	D	0	2				SBL	0.04	38	D	1	4
				SBR EBLTR	0.17	47 5	D A	0 26	22 54				SBR EBLTR	0.18	40 5	D A	0 32	20 63
Alma St. &				WBLTR		3	A	13	21				WBLTR	0.43	3	A	20	33
Paisley St.	0.43	9	Α	NBLTR	0.60	43	D	13	26	0.47	9	Α	NBLTR	0.61	42	D	16	30
				SBLTR	0.27	35	D	6	16				SBLTR	0.23	35	С	6	16
				EBL	0.22	22	С	9	20				EBL	0.36	22	С	13	25
				EBTR	0.66	35	С	60	88				EBTR	0.69	33	С	69	107
				WBL	0.20	18	В	6	13				WBL	0.18	19	В	4	10
Edinburgh Rd &	0.71	33	С	WBT	0.53	28	С	40	65	0.79	40	D	WBT	0.66	31	С	56	89
Paisley St				NBL	0.33	18	В	6	14				NBL	0.65	27	С	10	19
				NBTR SBL	0.88	41 19	D B	88 6	149 12				NBTR SBL	0.94	49 21	D C	95 7	160 15
				SBTR	0.79	34	С	74	124				SBTR	0.49	51	D	95	161
				EBL	0.21	29	С	8	16				EBL	0.36	31	С	7	16
				EBTR	0.73	40	D	45	64				EBTR	0.50	32	С	29	45
				WBL	0.58	38	D	13	26				WBL	0.46	32	С	15	27
Edinburgh Rd &	0.62	21	С	WBTR	0.38	31	С	21	34	0.64	20	С	WBTR	0.73	39	D	46	66
Waterloo Ave	0.02			NBL	0.04	10	В	1	6	0.04	20		NBL	0.10	5	Α	1	11
				NBTR	0.58	20	В	71	132				NBTR	0.62	17	В	128	167
				SBL SBTR	0.12	7 9	A A	3 40	9 77				SBL SBTR	0.15	7	A B	3 57	10 109
				EBL	0.45	14	В	8	17				EBL	0.38	19	В	8	109
				EBT	0.53	23	С	47	69				EBT	0.71	30	С	59	81
				EBR	0.09	18	В	0	12				EBR	0.14	22	С	1	15
				WBL	0.34	14	В	9	18				WBL	0.60	19	В	16	42
				WBT	0.43	21	С	34	52				WBT	0.69	28	С	61	88
Edinburgh Rd &	0.56	23	С	WBR	0.03	17	В	0	0	0.73	28	С	WBR	0.04	19	В	0	3
Wellington St				NBL	0.60	24	С	22	38				NBL	0.69	27	С	21	35
				NBT	0.47	27	С	35	48				NBT	0.57	27	С	47	58
				NBR SBL	0.13	24 18	C B	3	15 6				NBR SBL	0.14	23 23	C	9	14 16
				SBT	0.13	29	С	39	46				SBT	0.71	32	С	56	70
				SBR	0.03	28	С	0	2				SBR	0.04	24	С	0	3
				EBLTR		6	A	12	25				EBLTR	0.39	6	A	22	47
Yorkshire St &	0.35	18	В	WBLTR	0.24	56	Α	13	28	0.41	11	В	WBLTR	0.36	6	Α	21	45
Paisley St	0.35	10				30	С	21	37	U.41	1 11	D	NBLTR	0.32	29	С	10	20
	ļ			SBLTR	_	39	D	22	41				SBLTR	0.54	32	С	14	29
				EBL	0.22	25	С	11	22				EBL	0.19	26	С	6	16
Norfolk St &	0.58	31	_	EBT	0.31	26 23	C	19 0	35 13	0.64	30	С	EBT EBR	0.32	28 26	C	19 0	34 14
Paisley St	0.58	21	<del> </del>	WBL	0.11	18	В	4	10	0.04	30	C	WBL	0.15	19	В	9	19
				WBT	0.11	19	В	8	17				WBT	0.25	22	С	25	43
		I	ı	.,,,,	V.12						l	l	,,,,,,	0.00				1 -0



				Al	/I Peal	k Hour							PM	Peak	Hour			
Intersection		Overall				Mov	ements				Overall				Move	ments		
Intersection	V/C	Delay	LOS	Dir	V/C	Delay	LOS	Queu	e (m)	V/C	Delay	LOS	Dir	V/C	Delay	LOS	Queu	e (m)
	V/C	(s)	LUS	DIF	V/C	(s)	LUS	50th	95th	V/C	(s)	LUS	DIF	V/C	(s)	LUS	50th	95th
				WBR	0.05	18	В	3	8				WBR	0.17	20	В	8	17
				NBL	0.37	24	С	11	19				NBL	0.58	15	В	10	20
				NBTR	0.54	28	С	41	72				NBTR	0.83	30	С	64	129
				SBL	0.07	16	В	2	6				SBL	0.21	16	В	5	10
				SBTR	0.87	41	D	79	137				SBTR	0.88	43	D	78	136
				EBL	0.64	36	D	35	60				EBL	0.42	30	С	20	38
Gordon				EBR	0.13	24	С	0	14				EBR	0.12	24	С	0	14
St/Norfalk St &	0.59	18	В	NBL	0.27	9	Α	8	8	0.56 22	С	NBL	0.34	13	В	7	14	
Ave/Wilson St				NBT	0.54	14	В	67	85				NBT	0.60	15	В	59	90
				SBTR	0.56	15	В	29	46				SBTR	0.58	25	С	68	82
				EBL	0.56	22	С	10	19				EBL	0.62	26	С	14	31
				EBTR	0.63	25	С	48	80				EBTR	0.79	36	D	76	119
				WBL	0.14	19	В	3	7				WBL	0.52	20	С	13	23
W-III				WBTR	0.90	41	D	79	120				WBTR	1.12	101	F	136	193
Wellington St & Gordon St	1.14	51	F	NBL	0.43	20	В	12	23	1.47	102	F	NBL	0.61	27	С	16	29
doidon ot				NBT	0.82	37	D	64	88				NBT	0.78	39	D	67	88
				NBR	0.03	22	С	0	0				NBR	0.03	25	С	0	0
				SBL	1.44	250	F	53	106				SBL	2.05	516	F	123	190
<u> </u>				SBTR	0.64	22	С	39	56				SBTR	0.74	37	D	62	83

EBL=eastbound left, EBTR=eastbound through shared with right, WBLTR=westbound through shared with left and right

## 2.6.2 UNSIGNALIZED INTERSECTIONS

A summary of the Synchro results for the signalized intersection operations is presented in **Table 2-11**. Detailed Synchro reports are provided in **Appendix C**. During both the AM and PM peak hours, unsignalized intersections are shown to operate well. At Norfolk Street and Cork Street intersection, the eastbound and westbound movements are constrained. This is the result of high vehicular volume along northbound and southbound Norfolk Street, limiting the opportunities for eastbound and westbound vehicles to complete their movement.

TABLE 2-11: UNSIGNALIZED INTERSECTION ANALYSIS (EXISTING CONDITIONS) - STUDY AREA A

		A	M Peak Ho	ur		PM Peak Hour						
Intersection	Dir	Delay (s)	95 <sup>th</sup> Queue (m)	V/C	LOS	Dir	Delay (s)	95 <sup>th</sup> Queue (m)	V/C	LOS		
Silvercreek Pkwy and	WBL	7.7	4	0.16	Α	WBL	7.7	5	0.17	Α		
Waterloo Ave	NBL	9.5	7	0.25	Α	NBL	9.8	8	0.25	Α		
Alma St and Waterloo Ave	EBL	0.5	0	0.01	Α	EBL	0.8	0.4	0.02	Α		
Allila St allu Waterioo Ave	SBLR	11.1	2	0.08	В	SBLR	11.8	2.6	0.10	В		
	EBLTR	12.1	39	0.48	В	EBLTR	10.1	27	0.34	В		
Waterloo Ave & Yorkshire St	WBLTR	9.8	20	0.28	Α	WBLTR	10.3	28	0.36	В		
	NBLTR	8.7	9	0.08	Α	NBLTR	8.6	9	0.07	Α		
	SBLTR	9.3	17	0.20	Α	SBLTR	8.9	14	0.15	Α		
	EBLTR	0.3	0	0.01	Α	EBLTR	0.5	0	0.01	Α		
Glasgow St and Paisley St	WBLTR	0.3	0	0.01	Α	WBLTR	0.4	0	0.01	Α		
Glasgow Stallu Palsiey St	NBLTR	13.8	4	0.15	В	NBLTR	17.0	5	0.17	С		
	SBLTR	14.6	4	0.15	В	SBLTR	17.0	3	0.10	С		
	EBLTR	1.6	1	0.04	Α	EBLTR	1.3	1	0.03	Α		
Glasgow St and Waterloo	WBLTR	0.9	0	0.01	Α	WBLTR	0.3	0	0.01	Α		
Ave	NBLTR	15.0	2	0.08	В	NBLTR	13.2	2	0.09	В		
	SBLTR	12.9	4	0.15	В	SBLTR	13.2	4	0.15	В		
	EBLTR	47.4	11	0.36	Е	EBLTR	43.3	8	0.28	Е		
Norfalls St and Carls St	WBLTR	92.2	23	0.63	F	WBLTR	205.9	44	1.04	F		
lorfolk St and Cork St	NBL	1.5	1	0.04	Α	NBL	1.0	1	0.03	Α		
	SBL	9.3	2	0.07	Α	SBL	9.9	1	0.05	Α		



## 2.7 Traffic Operations at Rail Crossings

Traffic operations at the level rail crossings were also analysed in Synchro for the AM and PM peak hours. Following assumption and methodology were employed for the gate signal timing calculations.

- A hold phase for the rail track was implemented. Timing for the hold phase was calculated based on the train length, train speed, and the gate closing and opening time.
- Average GO train length was based on a 7 car consist. This configuration was sourced from the train data collected from February 27 March 6, 2021, for the Traffic Impact Study (the Silvercreek Study) completed by BA Consulting Group Ltd. in August 2021 for a proposed subdivision located at 35 to 40 Silvercreek Parkway South. A GO Train car length of 25.9 metres was used. The train consist of 7 cars was confirmed during the site visit as well.
- Average train speed of 20 km/h calculated from the speeds recorded in the above-mentioned train data.
- Cargo trains were converted into equivalent GO train consist due to the Synchro's limitation to have a uniform cycle length throughout the peak period.
- Transport Canada Grade Crossing Standards specify a gate closing time of 10-15 seconds and gate opening
  time of 6-12 seconds. Gate opening and closing timings were observed at the Yorkshire LRC during the site
  visit and found to be in the same ranges. To be conservative 15 seconds and 12 seconds have been used
  for the analysis as gate closing and gate opening time, respectively.

According to the GO Train schedule provided by the City, there are two eastbound trains during the AM peak hour and two westbound trains during the PM peak hour. The cargo trains do not follow any schedule, however the City provided a train count data from February 27 to March 06, 2021, conducted for the Traffic Impact Study completed by BA Group in support of a mixed-use subdivision at 35 to 40 Silvercreek Parkway South. From this data the number of cargo trains within the AM and PM peak hour were extracted and converted to equivalent number of GO trains assuming seven (7) cars per an average GO consist. The train count data is provided in **Appendix D**.

The rail crossing signal timings have been calculated using the above noted assumptions and the number of trains crossing during the AM and PM peak hours. The signal timings are summarized in **Table 2-12**, while detailed calculations are provided in **Appendix D**.

TABLE 2-12. LEVEL RAIL CROSSING GATE SIGNAL TIMINGS

	Trains			\$	Signal Timings (second	s)
	Eastbound	Westbound	Total Trains	Hold Phase	Northbound/ Southbound Phase	Cycle Length
GO Trains	2	2				
Equivalent GO of Cargo Trains	2	0	6	58	542	600

**Table 2-13** summarizes the traffic operational performance at the four (5) rail crossings within the Study Area A. Detailed Synchro reports are provided in **Appendix D**. The crossings are operating acceptably during both the AM and PM peak hours. The queues at Edinburgh Road LRC are shown to be significantly long during the PM peak hour extending close to 200 m.

During the site visit, the queues at Edinburgh LRC were observed to be comparable to those predicted by Synchro. There were no queues observed at Yorkshire Street LRC during the train crossing. The queues predicted by Synchro are minimal and represent an average condition therefore it can be inferred that no significant queue issues are present at Yorkshire LRC on the average. Similar inference can be drawn for Alma and Glasgow LRCs for similar traffic conditions.



TABLE 2-13: RAIL CROSSING OPERATIONS (EXISTING CONDITIONS) - STUDY AREA A

				AM Pea	ak Hour							PM Pea	ak Hour											
Level Rail		<b>O</b> verall			IV	lovement	s			<b>O</b> verall			IV	lovement	s									
Crossing	V/C	Delay (s)	LOS	Dir	V/C	Delay (s)	LOS	95 <sup>th</sup> Queue (m)	V/C	Delay (s)	LOS	Dir	V/C	Delay (s)	LOS	95 <sup>th</sup> Queu e (m)								
Edinburgh Dood	0.34	7	^	NB	0.37	7	Α	134	0.40	8	^	NB	0.42	8	Α	164								
Edinburgh Road	0.34	7	Α	SB	0.34	7	Α	118	0.42	8	Α	SB	0.46	8	Α	188								
Alma Chraat	0.09		5	5		NB	0.06	5	Α	17	0.13	-	^	NB	0.06	5	Α	19						
Alma Street	0.09	5	5 A	SB	0.10	5	Α	30	0.13	3 5 A	А	SB	0.14	5	Α	44								
Vaulsahina Chua ah	0.10	_	-	_	_	E	E	<b>E</b>	_	E		NB	0.11	5	Α	32	0.00	-		NB	0.06	5	Α	18
Yorkshire Street	0.10 5	5 A	SB	0.11	5	Α	32	0.08	5	Α	SB	0.09	5	Α	26									
Olas dans Church	0.06	0.00	06 5		NB	0.05	5	Α	17	0.00	_		NB	0.06	5	Α	19							
Glasgow Street 0.06	5	5 A	Α	Α	Α	Α	Α	SB	0.06	5	Α	19	0.06	5	Α	SB	0.04	5	Α	14				



## 3 Study Area B

Study Area B is bounded by Watson Parkway to the north and to the west, York Road to the south, and Watson Road to the east. **Figure 3-1** below shows the study area road network, the four (4) intersections included in the analysis of interest and the LRC at Watson Road. The rail track at Cityview Drive and the area in its immediate vicinity is also within the scope of study. Currently, there is no rail crossing at Cityview Drive. An active transportation connection is being assessed across the rail track at Cityview Drive.

#### FIGURE 3-1: STUDY AREA B



## 3.1 Existing Road Network

The existing road network within Study Area B consists of arterial roads collector and local roads, as described in the Schedule 5 of the City of Guelph Official Plan.

## York Road

York Road is an east-west arterial road with one-lane in each direction in the study area. It has rural cross-section within the study area with a posted speed limit of 60 km/h. York Road is a part of the Provincial Highway 7 Connecting Link for interregional passenger and goods movement. York Road serves primarily industrial land use.

## Watson Parkway

Watson Parkway is a north-south arterial road with one traffic lane in each direction. Within the study area, there are designated bicycle lanes in both directions of Watson Parkway, however sidewalks are only provided in the immediate vicinity of York Road intersection. Watson Parkway serves both industrial and residential land uses. The corridor has a posted speed limit of 60 km/h.

## Watson Road

Watson Road is a north-south collector road with one traffic lane in each direction. Watson Road serves primarily residential land uses, with a posted speed limit of 60 km/h. Watson Road has a lever rail crossing immediately north of York Road. No sidewalks or bicycle lanes are available on Watson Road.



## Starwood Drive

Starwood Drive is a north-south collector road with one traffic lane in each direction serving residential land uses. The Guelph Public Library's East Branch Is located along Starwood Drive. Starwood Drive has a posted speed limit of 50 km/h.

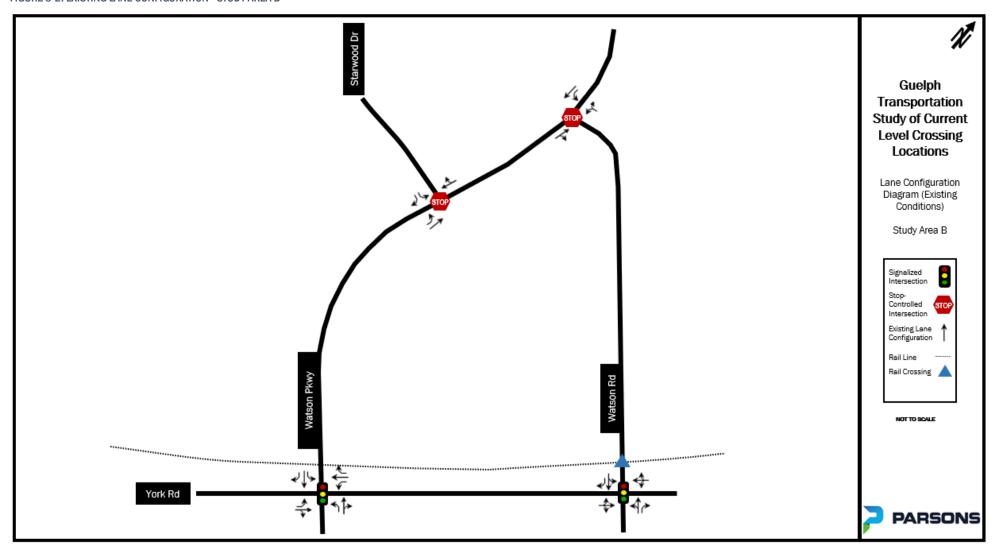
## Cityview Drive

Cityview Drive is a north-south local road running from Grange Road to York Road with a single traffic lane. It is discontinuous at the level rail crossing north of York Road. There are no sidewalks along the portion in the study area. In the absence of a posted speed limit, it is assumed that the speed along this road is 50 km/h. The City of Guelph is currently doing a land use study and urban design concept plan for the York Road/Elizabeth Street area.

A diagram illustrating the lane configurations at each of the intersections selected for analysis is presented below in **Figure 3-2.** 



FIGURE 3-2: EXISTING LANE CONFIGURATION - STUDY AREA B





## 3.2 Active Transportation Network

The active transportation facilities within the Study Area B mainly consist of the buffered bicycle lanes along Watson Parkway north of York Road. An off-road multi-use trail connects Watson Road and Fleming Road running along west of Clythe Creek. A trail, connecting this off-road trail, is planned along Watson Road turning west along the north bank of Clythe Creek and connecting to bike lanes on Watson Parkway and subsequently the desired route along York Road as shown in **Figure 3-3**. A signed bike route is also proposed along Cityview Drive along with a CN rail crossing connecting south to the desired route along York Road.

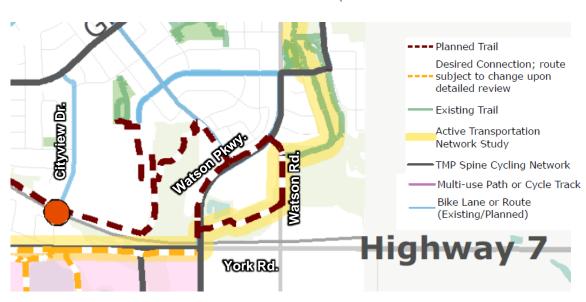


FIGURE 3-3: EXISTING AND PROPOSED ACTIVE TRANSPORTATION NETWORK (FIGURE SOURCE: MAP 3 OF THE GUELPH TRAIL

### 3.3 Transit Network

The Guelph Transit Commission operates four bus routes in the study area. **Figure 3-4.** below was retrieved from Guelph Transit's full system map on their website on October 17, 2021 and highlights local bus transit service within the study area.



FIGURE 3-4: CITY OF GUELPH TRANSIT SERVICE MAP (STUDY AREA B)



## 17 Woodlawn Watson

The 17 Woodlawn Watson route forms a loop around the City of Guelph, offering service along Watson Parkway and York Road within the study area. The route offers stops at Watson Parkway at Starwood Drive and York Road at Watson Parkway. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

#### 18 Watson Woodlawn

The 18 Watson Woodlawn route forms a loop around the City of Guelph, operating in the opposite direction as route 17 Woodlawn Watson. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

### 4 York

The 4 York route operates between the Guelph Central Station and Guelph Transit Centre using York Road and Watson Parkway. In the study area this route offers one bus stop at York Rd and Watson Parkway. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

## 14 Grange

The 14 Grange route operates along Watson Parkway with one stop at Watson Parkway and Starwood Drive in the study area. Throughout the day, including peak hours, the headway for this route is 30 minutes (2 buses/hour).

## 3.4 Level Rail Crossing

Only one level rail crossing exists within Study Area B at Watson Road, north of York Road as shown in **Figure 3-1**. The crossing is equipped with automatic gates, warning signals and bells. During the site visit it was noted that the crossing is equipped with a traffic signal pre-emption to clear any southbound queues at the Watson Road and York Road intersection as the space available between the crossing and the intersection is approximately 20m that is enough for three cars only. It was noted that hard rubber spike mat, shown in **Figure 3-5** was placed on either side of the crossing to discourage trespassing. There is no collision history available for the crossing. The City provided the collision history of the adjacent York Road & Watson Road intersection which reveals that collisions were primarily on York Road approaches and inside the intersection. As such the collision data is not applicable at the crossing.

This crossing is located on the same Metrolinx track as the crossings described under Study Area A and as such the same train schedule applies to this crossing as well (see Section 2.3.1). A total of 22 trains operate through each weekday according to the current schedule.



FIGURE 3-5: RUBBER SPIKE MAT AT WATSON ROAD LRC



## 3.5 Existing Traffic Data

Four intersections as shown in **Figure 3-1**, were selected in consultation with the City Staff for the traffic operational analysis in Study Area B. Two of these intersections are signalized, while the other two are unsignalized. Similar to the Study Area A, Parsons collected fresh traffic data in September 2021 and compared these with the pre-Covid TMCs provided by the City. The fresh data was found to be significantly lower than the pre-Covid traffic counts therefore like Study Area A, pre-Covid TMCs have been used for Study Area B traffic analysis. Intersections along with their count dates and sources are listed in **Table 3-1**. The data used in the analysis is shown in bold dates

Previously a four-legged intersection, the unsignalized intersection of Watson Parkway and Watson Road is currently a three-legged T-intersection. The historic TMCs for this intersection pertain to the four-legged configuration and therefore cannot be used. So, for this intersection the fresh data has been used. The standard industry practice of volume balancing has been employed to adjust the TMCs of this intersection with the adjacent intersections having the old data. The balanced AM and PM peak hour TMCs are included in **Appendix E**. The TMCs data sheets are also provided in **Appendix E**.

TABLE 3-1: INTERSECTIONS DATA SOUIRCE AND COUNT DTAES - STUDY AREA B

	Intersection	Data Source	Count Date
Signaliz	ed Intersections		_
1	Watson Rd and York Rd	Parsons City of Guelph	14-Sep-2021 <b>26-Mar-2019</b>
2	Watson Pkwy and York Rd	Parsons City of Guelph	14-Sep-2021 <b>27-Mar-2019</b>
Unsigna	lized Intersections		_
11	Watson Pkwy and Starwood Dr	Parsons City of Guelph	14-Sep-2021 <b>15-Sep-2016</b>
12	Watson Rd and Watson Pkwy	Parsons City of Guelph	<b>14-Sep-2021</b> 10-Oct-2012

Parsons collected 24-hour Automatic Traffic Recorder (ATR) 24-hour volume counts for 7 days from September 17 to September 23, 2021, at the rail crossing. The City also provided ATR data for the crossing which were collected from November 12 to 18, 2020. **Table 3-2** compares the Annual Average Daily Traffic (AADT) and the two-way peak hour volumes from 2020 and 2021 data. The data is comparable and therefore the greater of the two data for the respective crossings were used for rail crossings traffic operations analysis being conservative. The ATR data is provided in **Appendix E**.

TABLE 3-2: ATR DATA AT WATSON ROAD RAIL CROSSING

Year	AADT	Peak	Hour
		АМ	PM
2020	1642	156	209
2021	1752	165	213

Similar to TMCs, the AM and PM peak hour volumes at the rail crossing were adjusted/balanced utilizing the approach volumes of the nearest intersections. The balanced rail crossings' peak hour volumes are provided in **Appendix E** along with the balanced TMCs.

**Table 3-3** summarizes the pedestrian and bicycle counts provide by the City for Watson Road LRC. The data sheets are provided in **Appendix E**. The weekday counts were collected on Tuesdays and Wednesdays and the weekend



counts on Saturdays and Sundays from 6:00 AM to 12:00 AM. Overall the demand is minimal with the bicycle demand higher than the pedestrian demand.

TABLE 3-3: PEDESTRIAN AND BICYCLE COUNTS AT WATSON ROAD LRC

	Wee	kday	Wee	kend
Data Type	Tue (Sep 28, 2021)	Wed (Sep 29, 2021)	Tue (Sep 25, 2021)	Wed (Sep 26, 2021)
Total Volume				
Pedestrians	10	6	6	17
Bicycles	26	4	13	27
Total	36	10	19	44
Peak Hour Volume	9:45 - 10:45 AM	2:30 - 3:30 PM	9 - 10 AM	11 - 12 PM
Pedestrians	2	2	1	1
Bicycles	6	1	3	6
Total	8	3	4	7

## 3.6 Traffic Analysis

## 3.6.1 INTERSECTION OPERATIONS

The intersection operations are summarized in **Table 3-4** and **Table 3-5** for the signalized and unsignalized intersections, respectively. Detailed Synchro reports are provided in **Appendix F**. All the intersections are operating acceptably with adequate residual capacity. The queues exceeding the existing storage length are identified in red font. The southbound queue at Watson Road and York Road intersection is 32m while the available space is approximately 20m between the intersection and the Watson Road rail crossing.

TABLE 3-4: SIGNALIZED INTERSECTION ANALYSIS (EXISTING CONDITIONS) - STUDY AREA B

				Al	/I Peak	( Hour				PM Peak Hour									
Intercetion		Overall				Mov	ements				Overall				Move	ments			
Intersection	W (0	Delay		ъ.	W (0	Delay	100	Queu	e (m)	W (0	Delay	100	i	1/ (0	Delay		Queu	e (m)	
	V/C	(s)	LOS	Dir	V/C	(s)	LOS	50th	95th	V/C	(s)	LOS	Dir	V/C	(s)	LOS	50th	95th	
				EBLT	0.32	6	Α	13	34				EBLT	0.41	6	Α	17	41	
				EBR	0.03	5	Α	0	4				EBR	0.01	5	Α	0	0	
				WBLT	0.47	7	Α	20	50				WBLT	0.44	7	Α	18	44	
Watson Rd &	0.52	10	A	WBR	0.02	5	Α	0	3	0.47	9	Α	WBR	0.12	5	Α	2	10	
York Rd 0.5	0.52	10		NBLT	0.11	15	В	1	7	0.47		^	NBLT	0.56	19	В	9	26	
				NBR	0.01	14	В	0	0				NBR	0.04	15	В	0	7	
				SBLT	0.62	20	С	11	32				SBLT	0.25	16	В	3	12	
				SBR	0.01	14	В	0	0				SBR	0.0	15	В	0	0	
				EBL	0.29	14	В	7	16			EBL	0.63	18	В	19	35		
				EBT	0.44	18	В	26	56				EBT	0.58	20	С	51	80	
				EBR	0.07	16	В	0	10				EBR	0.07	16	В	0	10	
				WBL	0.08	16	В	2	7				WBL	0.10	16	В	3	7	
				WBT	0.66	24	С	47	75				WBT	0.73	27	С	55	86	
Watson Pkwy &	0.63	21	С	WBR	0.02	17	В	0	0	0.78	24	С	WBR	0.05	18	В	0	4	
York Rd				NBL	0.29	15	В	5	14				NBL	0.63	20	С	23	43	
				NBT	0.18	17	В	10	23				NBT	0.83	34	С	61	116	
				NBR	0.02	16	В	0	0				NBR	0.01	18	В	0	0	
				SBL	0.14	15	В	5	13	:	1			SBL	0.15	19	В	3	8
				SBT	0.74	27	С	53	102				SBT	0.44	23	С	25	46	
·				SBR	0.15	18	В	0	15				SBR	0.08	20	С	0	12	



TABLE 3-5: UNSIGNALIZED INTERSECTION ANALYSIS (EXISTING CONDITIONS) - STUDY AREA B

		Α	M Peak Ho	our			PI	M Peak Ho	ur	
Intersection	Dir	Delay (s)	95 <sup>th</sup> Queue (m)	V/C	LOS	Dir	Delay (s)	95 <sup>th</sup> Queue (m)	V/C	LOS
Water Divisi 9 Water Dd	WBL	7.9	2	0.09	Α	WBL	8.4	1	0.04	А
Watson Pkwy & Watson Rd	NBL	12.7	3	0.10	В	NBL	15.8	13	0.37	С
	EBL	8.5	2	0.07	Α	EBL	8.9	9	0.26	Α
Watson Pkwy and Starwood Dr.	SBL	16.4	4	0.14	С	SBL	36.2	3	0.13	E
DI.	SBR	15.8	20	0.48	С	SBR	10.5	5	0.17	В

#### 3.6.2 RAIL CROSSING OPERATION

The rail crossing operations have been analyzed following the same methodology described in **Section 2.7**. **Table 3-6**. summarizes the traffic operational performance of the crossing during the AM and PM peak hours. Detailed Synchro reports are provided in **Appendix F** along with the intersections' Synchro reports.

The crossing is operating well, however the northbound queue during the PM peak hour is shown to be 39m which is longer than the approximately 20m available space between the crossing and the Watson Road and York Road intersection. However, as noted earlier, it was observed during the site visit that the rail crossing, and the intersection are equipped with a train pre-emption. It was noted that when the train was approaching, the left and right turns from the York Road were restricted with the east-west green phases terminated. The southbound movement from the Watson Road was given green to clear the queues.

TABLE 3-6: WATSON ROAD RAIL CROSSING OPERATIONS (EXISTING CONDITIONS) - STUDY AREA B

			AM Pea	ak Hour							PM Pea	ak Hour			
	Overall Movements							Overall Movements							
V/C	Delay (s)	LOS	Dir	V/C	Delay (s)	LOS	95 <sup>th</sup> Queue (m)	V/C	Delay (s)	LOS	Dir	V/C	Delay (s)	LOS	95 <sup>th</sup> Queue (m)
0.34	11	В	NB	0.03	5	Α	10	0.43	13	Р	NB	0.12	5	Α	39
0.54	11	В	SB	0.12	5	Α	37	0.43	13	В	SB	0.04	5	Α	12

## 3.7 Cityview Dive

There is no existing crossing across the rail track at Cityview Drive however a pedestrian and bicycle traffic survey completed by the City suggests that desire lines exist for active transportation connection across the track. **Table 3-7** summarizes the data collected. The weekday counts were collected on Tuesdays and Wednesdays and the weekend counts on Saturdays and Sundays from 6:00 AM to 12:00 AM. The data sheets are provided in **Appendix D**.

TABLE 3-7: PEDESTRIAN AND BICYCLE COUNTS AT CITYVIEW DRIVE ACROSS RAIL TRACK

	Wee	kday	Weekend			
Data Type	Tue (Oct 05, 28, 2021)	Wed (Oct 06, 2021)	Tue (Oct 02, 2021)	Wed (0ct 03, 2021)		
Total Volume						
Pedestrians	7	15	10	19		
Bicycles	6	2	9	10		
Total	13	17	19	9		



## **4 Summary of Analysis Conclusions**

This memorandum documented the inventory and technical analysis of the existing transportation infrastructure for the Guelph Level Rail Crossing Transportation Study. The assessment of transportation conditions at intersections was conducted for two study areas using the Synchro Software. The following two subsections summarize the analysis for study areas A and B.

## 4.1 Study Area A

Study Area A includes four (4) level rail crossings in total: Alma Street, Edinburgh Road, Yorkshire Street, and Glasgow Street. Based on observations of train shunting operations, queues on Edinburgh Road extend relatively far upstream of the level crossing for long periods of time. A review of collision data between 2016 and 2021 revealed that there were fewer than five (5) collisions at each of the four level crossings. However, at the Edinburgh Road level rail crossing, all five (5) collisions over the five-year duration were rear-end impacts. It is anticipated that rear-end impacts are the result of large queues during busy traffic periods resulting in queues following too closely.

Based on traffic data collected at the level rail crossings, the Edinburgh Road LRC was found to significantly serve more traffic during the peak hours than the other three crossings. It was also found that traffic from the Dublin Street LRC closure was diverted to Glasgow and Yorkshire Streets. Additionally, pedestrian and bicycle volumes were typically found to be higher during the weekends and in the PM periods.

Under existing conditions, all the signalized intersections in Study Area A operate acceptably with adequate residual capacity, except for the Wellington Street at Gordon Street intersection during both the AM and PM peak hours. At this intersection, the southbound left movement has queues exceeding the available storage during both the AM and PM peak hours, while the westbound through shared with right turn movement is constrained during the PM peak hour and approaching capacity in the AM peak hour. Finally, the shared northbound and southbound through-right movements are found to be approaching capacity at Edinburgh Road and Paisley Street.

All of the unsignalized intersections are shown to operate well under existing conditions, however, at the two-way stop-controlled intersection of Norfolk Street and Cork Street, the eastbound and westbound movements experience relatively high delay. Based on the operational analysis of the LRCs, it was found that the crossing at Edinburgh Road experiences relatively long queues during both the AM and PM peak hours. The remainder of the level crossings were found to operate with acceptable delay and queues. These findings were corroborated during the site visit.

## 4.2 Study Area B

Study Area B only has a single level rail crossing at Watson Road, north of York Road. This crossing does not experience any train shunting. There was no collision history data available at this level crossing. Based on available AADT data, the level crossing facilitates 1,752 vehicles each day. Similarly, based on Metrolinx's GO Train schedule, a total of 22 trains operates each weekday at this rail crossing. Based on pedestrian and bicycle counts at the Watson Road north of York Road LRC, both pedestrian and bicycle demand is minimal, however, there are more bicycles than pedestrians.

Under existing conditions, both of the signalized intersections operate acceptably with adequate residual capacity. Only the southbound queue at Watson Road and York Road exceeds the available 20 meters of space between the intersection and the rail crossing. Both of the unsignalized intersections in the study area operate acceptably. Based on the operational analyses conducted at the LRC, the northbound queue during the PM peak hour is longer than the 20 meters of available space between the crossing and the Watson Road and York Road intersection. However, the intersection and the rail crossing are equipped with a train pre-emption. Finally, based on a pedestrian and bicycle traffic survey completed by the City, desire lines exist for an active transportation connection across the Cityview Drive rail track.



## Attachment(s)/Enclosure

Appendix A - Collision Data

Appendix B – Turning Movement Count Data (Study Area A)

Appendix C – Synchro Reports (Study Area A)

Appendix D - Train Data and Rail Crossing Modelling Assumptions

Appendix E – Turning Movement Count Data (Study Area B)

Appendix F - Synchro Reports (Study Area B)





**APPENDIX A** 

# **RAIL CROSSING** COLLISION DATA



From: To:

Location ........... GLASGOW ST N @ NORTHUMBERLAND ST Municipality....... GUELPH

Traffic Control.... Stop sign Total Collisions.... 3

	1 0										
Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
20003129	2020-Jan-16, Thu,09:27	Snow	Angle	P.D. only	East	Loose snow	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of- way	
Comments:					South	Loose snow	oose snow Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
20040530	2020-Jul-23, Thu,13:05	Rain	SMV unattended vehicle	dP.D. only	East	Wet	Turning left	Automobile, station wagon	Unattended vehicle	Improper turn	
Comments	<b>::</b>					Wet	Parked	Automobile, station wagon	Other motor vehicle		Daylight
502843093	2020-Feb-25, Tue,19:30	Clear	Angle	P.D. only	South	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments	<b>s:</b>				West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Failed to yield right-of- way	Dark, artificial

Friday, November 12, 2021 Page 1 of 1



Location ......... ALMA ST N @ CRIMEA ST

Traffic Control.... Stop sign

Gullisian ID. Pata (Paul Time and Equation and Eq

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
20049624	2020-Sep-04, Fri,19:13	Clear	SMV other	Non-fatal injury	/ South	Dry	Going ahead	Pick-up truck	Ran off road	Other	
Comments	s:					Dry					Dusk
502596633	2018-Dec-20, Thu,14:15	Clear	Turning movement	P.D. only	West	Dry	Turning right	Automobile, station wagon	Other motor vehicle	Driving properly	
Comments	s:				West	Dry	Going ahead	Automobile, station wagon	Other motor vehicle	Other	Daylight

Tuesday, November 9, 2021 Page 1 of 1



From: To:

Location ....... EDINBURGH RD N @ FOSTER AV Municipality....... GUELPH

Traffic Control.... Stop sign Total Collisions.... 2

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
19073469	2019-Dec-21, Sat,15:00	Snow	Rear end	P.D. only	North	Slush	- 3	Automobile, station wagon	Other motor vehicle	Following too close	
Comments	<b>s</b> :				North	Slush	Slowing or stopping	Pick-up truck	Other motor vehicle	Driving properly	Daylight
502902713	2020-Sep-11, Fri,15:10	Clear	Rear end	P.D. only	North	Dry		Automobile, station wagon	Other motor vehicle		
Comments	s:				North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Other	Daylight

Tuesday, November 9, 2021 Page 1 of 1



From: To:

Location ....... EDINBURGH RD N @ PRESTON ST Municipality...... GUELPH

Traffic Control.... No control Total Collisions.... 3

Collision ID	Date/Day/Time	Environment	Impact Type	Classification	Direction	Surface Cond'n	Vehicle Manoeuver	Vehicle type	First Event	Driver Action	No. Ped
18004533	2018-Jan-25, Thu,11:15	Clear	Rear end	Non-fatal injury	/ North	Dry	- 3	Automobile, station wagon	Other motor vehicle	Other	
Comments	s: d1 charged				North	Dry	Slowing or stopping	Passenger van	Other motor vehicle	Driving properly	Daylight
19047457	2019-Aug-22, Thu,14:37	Clear	Rear end	P.D. only	North	Dry	Slowing or stopping	Automobile, station wagon	Other motor vehicle	Following too close	
Comments	s: other				North	Dry		Automobile, station wagon	Other motor vehicle	Driving properly	Daylight
502658581	2019-Apr-03, Wed,12:00	Clear	Rear end		South	Dry	Slowing or stopping	Pick-up truck	Other motor vehicle		
Comments	<b>s</b> :				South	Dry	Stopped	Automobile, station wagon	Other motor vehicle		Daylight

Tuesday, November 9, 2021 Page 1 of 1



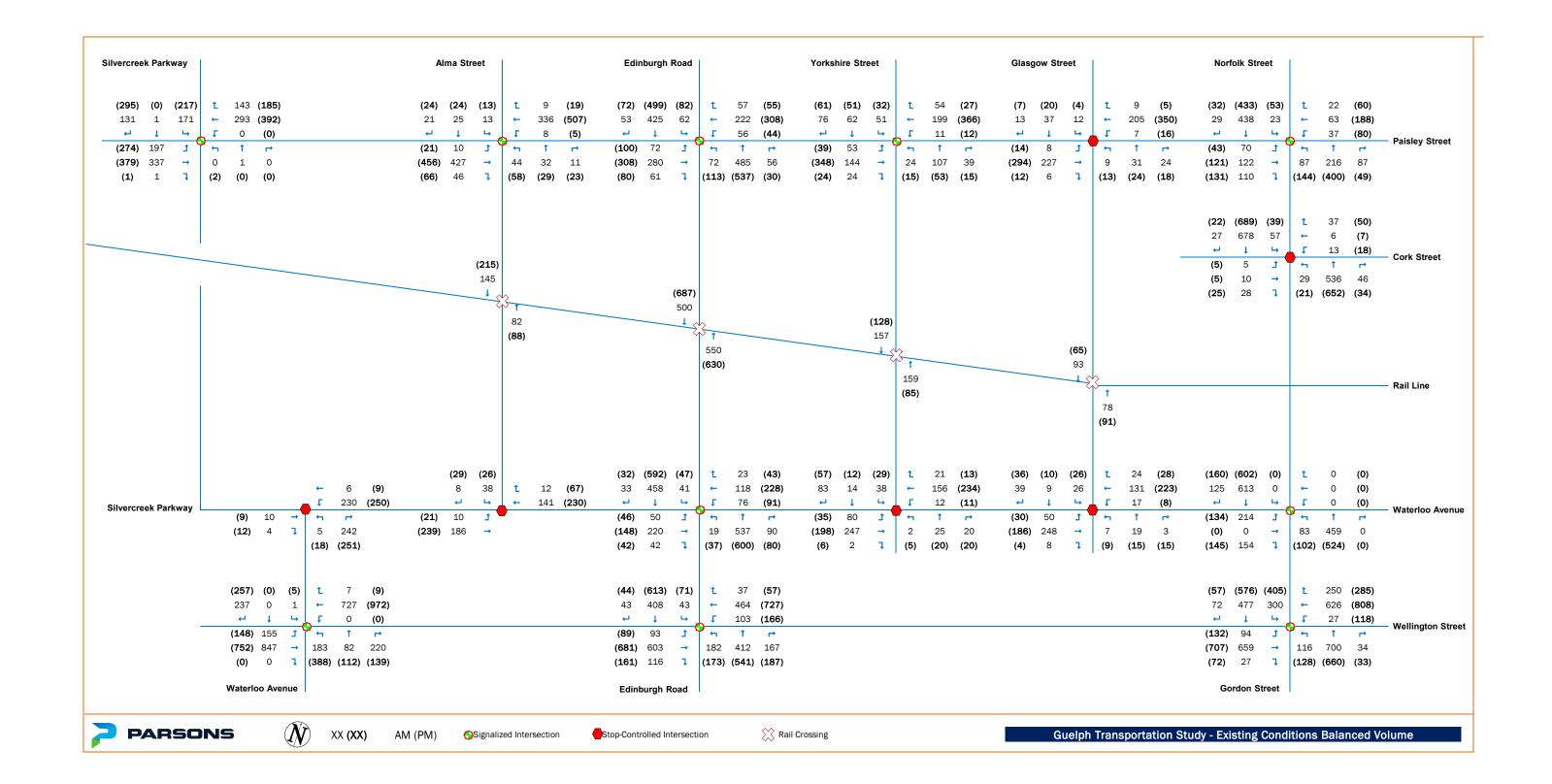
From: To: YORKSHIRE ST N @ FOSTER AV Municipality..... **GUELPH** Location ..... Traffic Control.... Other Total Collisions.... 1 Collision ID Date/Day/Time Impact Type Vehicle Manoeuver Vehicle type Driver Action Classification Direction Surface Cond'n First Event No. Ped Environment 502263580 2017-Feb-21, Tue,17:00 Clear Other Non-reportable South Wet Reversing Automobile, Other motor Driving properly station wagon vehicle Comments: South Stopped Other motor Daylight vehicle

Tuesday, November 9, 2021 Page 1 of 1



**APPENDIX B** 

# **TURNING MOVEMENT COUNT DATA** (STUDY AREA A)



#### Alma St N @ Paisley Rd **Morning Peak Diagram Specified Period One Hour Peak From:** 7:00:00 From: 8:15:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000004 Intersection: Paisley Rd & Alma St N Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley Rd runs W/E North Leg Total: 224 Cyclists 1 0 2 Cyclists 0 East Leg Total: 627 East Entering: North Entering: 122 Trucks 3 0 Trucks 4 325 North Peds: Cars 98 East Peds: 82 Cars 49 57 10 116 54 $\mathbb{Z}$ Totals 102 Peds Cross: Totals 53 10 Peds Cross: 59 Alma St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 15 389 408 0 0 10 276 10 2 288 26 1 27 Paisley Rd 312 3 Cyclists Trucks Cars Totals Paisley Rd 0 3 22 25 10 11 266 287 5 76 82 Trucks Cyclists Totals 1 Cars 364 281 302 Alma St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 159 Cars 64 5 135 West Peds: 172 Trucks 2 Trucks 2 0 3 South Peds: 137 West Entering: 394 Cyclists 7 1 Cyclists 1 0 South Entering: 139 West Leg Total: 802 Totals 67 South Leg Total: 307 Totals 168 **Comments**

#### Alma St N @ Paisley Rd Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000004 Intersection: Paisley Rd & Alma St N Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley Rd runs W/E North Leg Total: 102 Cyclists 0 0 Cyclists 3 East Leg Total: 646 0 East Entering: North Entering: 48 Trucks 0 0 Trucks 0 321 North Peds: East Peds: 14 Cars 11 33 3 47 Cars 51 8 $\mathbb{X}$ Peds Cross: Totals 11 3 Totals 54 Peds Cross: $\bowtie$ 34 Alma St N Totals Trucks Cyclists Totals Cyclists Trucks Cars 10 347 361 11 293 1 301 7 2 9 Paisley Rd 310 Cyclists Trucks Cars Totals Paisley Rd 0 0 16 16 2 7 302 311 3 4 50 57 Trucks Cyclists Totals Cars 5 2 368 315 325 Alma St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 90 Cars 43 10 78 West Peds: 5 Trucks 4 Trucks 3 0 1 4 South Peds: 7 West Entering: 384 Cyclists 3 5 South Entering: 87 Cyclists 6 0 West Leg Total: 745 Totals 49 South Leg Total: 187 Totals 100 **Comments**

#### Alma St N @ Paisley Rd **Afternoon Peak Diagram Specified Period One Hour Peak From:** 17:00:00 From: 15:00:00 To: 18:00:00 To: 18:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000004 Intersection: Paisley Rd & Alma St N Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley Rd runs W/E North Leg Total: 116 Cyclists 0 1 2 Cyclists 3 East Leg Total: 875 0 East Entering: North Entering: 51 Trucks 0 0 Trucks 0 427 North Peds: Cars 62 East Peds: Cars 19 25 5 49 5 $\mathbb{X}$ Peds Cross: Totals 19 6 Totals 65 Peds Cross: ⋈ 26 Alma St N $\mathbb{L}$ Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 12 463 482 0 0 14 389 6 6 401 12 0 12 Paisley Rd 415 6 Cyclists Trucks Cars Totals Paisley Rd 0 0 18 18 5 417 428 71 Trucks Cyclists Totals 6 1 64 Cars 499 436 6 448 Alma St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 101 Cars 55 14 99 West Peds: 6 Trucks 1 Trucks 1 0 0 1 South Peds: 5 West Entering: 517 Cyclists 7 Cyclists 6 9 South Entering: 109 0 West Leg Total: 999 Totals 62 South Leg Total: 218 Totals 109 **Comments**

## Alma St N @ Paisley Rd

## **Total Count Diagram**

Municipality: Guelph

**Site #:** 0000000004

Intersection: Paisley Rd & Alma St N

TFR File #: 4

North Leg Total: 977

North Entering: 522

North Peds:

Peds Cross:

Peds Cross:

West Peds:

West Entering: 3067

West Leg Total: 6123

Count date: 14-Sep-2021

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Signalized Intersection \*\*

236

⋈

Cyclists 5 18 1 24

Trucks 7 1 3 11 Cars 183 248 56 487

Totals 195 267 60

Cyclists Trucks Cars Totals Alma St N

43 86 2927 3056

Paisley Rd

Cyclists Trucks Cars Totals 0 4 108 112 37 62 2404 2503 13 419 452 20 57 2931

 $\mathbb{X}$ 

369

Cars 7

Cars 759
Trucks 14
Cyclists 42
Totals 815



Alma St N



Cars 332 236 94 662
Trucks 14 3 3 20
Cyclists 19 13 0 32
Totals 365 252 97

Major Road: Paisley Rd runs W/E

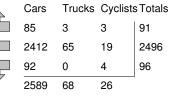
Cyclists 16

Trucks 10

Cars 429

Totals 455

East Leg Total: 5343
East Entering: 2683
East Peds: 156
Peds Cross: X



Paisley Rd

Cars Trucks Cyclists Totals
2554 68 38 2660

Peds Cross: 
South Peds: 307

South Entering: 714

South Leg Total: 1529

### Alma St S @ Waterloo Ave **Morning Peak Diagram Specified Period One Hour Peak** From: 8:15:00 **From:** 7:00:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000005 Intersection: Waterloo Ave & Alma St S Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 1 North Leg Total: 68 1 2 Cyclists 0 East Leg Total: 377 0 North Entering: 46 Trucks 0 Trucks 0 East Entering: 0 153 North Peds: East Peds: Cars 7 37 44 Cars 22 0 $\mathbb{X}$ Totals 22 Peds Cross: Totals 8 38 Peds Cross: $\bowtie$ Alma St S Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 5 143 149 0 12 141 136 5 0 Waterloo Ave 5 0 148 Cyclists Trucks Cars Totals Waterloo Ave 0 0 10 10 11 173 186 Trucks Cyclists Totals Cars 183 210 224 $\mathbb{X}$ Peds Cross: West Peds: 2 West Entering: 196 West Leg Total: 345 **Comments**

### Alma St S @ Waterloo Ave Mid-day Peak Diagram **Specified Period One Hour Peak** From: 12:15:00 From: 11:00:00 To: 13:30:00 To: 13:15:00 Municipality: Guelph Weather conditions: Site #: Cloudy/Dry 000000005 Intersection: Waterloo Ave & Alma St S Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 46 1 Cyclists 0 East Leg Total: 296 North Entering: 30 Trucks 2 0 2 East Entering: Trucks 1 143 North Peds: East Peds: 13 Cars 11 16 27 Cars 15 0 $\mathbb{X}$ 17 Peds Cross: Totals 13 Totals 16 Peds Cross: $\bowtie$ Alma St S Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 6 133 145 0 11 132 122 6 Waterloo Ave 5 6 132 Cyclists Trucks Cars Totals Waterloo Ave 0 0 5 5 130 136 Trucks Cyclists Totals Cars 3 135 146 153 $\mathbb{X}$ Peds Cross: West Peds: 0 West Entering: 141 West Leg Total: 286 **Comments**

### Alma St S @ Waterloo Ave **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:30:00 From: 15:00:00 To: 18:00:00 To: 16:30:00 Municipality: Guelph Weather conditions: Site #: Cloudy/Dry 000000005 Intersection: Waterloo Ave & Alma St S Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 58 1 Cyclists 1 East Leg Total: 406 North Entering: 32 Trucks 0 0 0 Trucks 0 East Entering: 208 North Peds: East Peds: Cars 6 25 31 Cars 25 0 $\mathbb{X}$ Totals 26 Peds Cross: Totals 6 26 Peds Cross: ⋈ Alma St S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 3 197 203 0 1 11 191 197 3 Waterloo Ave 201 4 Cyclists Trucks Cars Totals Waterloo Ave 0 0 15 15 5 164 172 Trucks Cyclists Totals Cars 5 179 189 198 $\mathbb{X}$ Peds Cross: West Peds: 10 West Entering: 187 West Leg Total: 390 **Comments**

## Alma St S @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

**Site #:** 0000000005

Intersection: Waterloo Ave & Alma St S

TFR File #: 5

Count date: 14-Sep-2021

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

## \*\* Non-Signalized Intersection \*\*

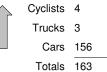
rsection \*\* Major Road: Waterloo Ave runs W/E

 Cyclists
 1
 7
 8

 Trucks
 3
 1
 4

 Cars
 46
 162
 208

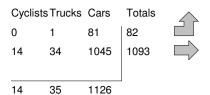
 Totals
 50
 170



Cyclists Trucks Cars Totals
17 38 1119 1174

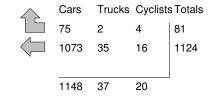


Waterloo Ave





Alma St S



Waterloo Ave

Cars Trucks Cyclists Totals 1207 35 21 1263

Peds Cross: 

West Peds: 17

West Entering: 1175

West Leg Total: 2349

#### Edinburgh Rd N @ Paisley Rd **Morning Peak Diagram Specified Period One Hour Peak** From: 7:00:00 **From:** 7:45:00 To: 9:30:00 To: 8:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000006 Edinburgh Rd N & Paisley Rd Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Edinburgh Rd N runs N/S North Leg Total: 673 Cyclists 0 0 2 Cyclists 3 East Leg Total: 436 13 North Entering: 306 Trucks 1 4 Trucks 11 East Entering: 201 North Peds: 32 Cars 57 203 31 291 Cars 353 East Peds: 13 $\mathbb{X}$ Totals 367 Peds Cross: Totals 58 213 Peds Cross: ⋈ 35 Edinburgh Rd N Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 8 234 244 2 32 133 2 142 26 0 27 Paisley Rd 188 Cyclists Trucks Cars Totals Paisley St 3 63 66 155 165 Trucks Cyclists Totals 58 62 1 3 Cars 5 12 276 220 235 Edinburgh Rd N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 287 Cars 44 261 34 339 West Peds: 3 Trucks 12 Trucks 0 1 8 South Peds: 8 West Entering: 293 Cyclists 3 1 Cyclists 0 0 South Entering: 348 West Leg Total: 537 Totals 44 South Leg Total: 650 Totals 302 **Comments**

#### Edinburgh Rd N @ Paisley Rd Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:30:00 To: 13:30:00 To: 12:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000006 Edinburgh Rd N & Paisley Rd Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Edinburgh Rd N runs N/S North Leg Total: 970 Cyclists 0 0 0 Cyclists 3 East Leg Total: 568 4 14 North Entering: 478 Trucks 1 Trucks 16 East Entering: 286 North Peds: East Peds: 30 Cars 58 343 63 464 Cars 473 6 $\mathbb{X}$ Peds Cross: Totals 59 352 67 Totals 492 Peds Cross: Edinburgh Rd N Totals Cyclists Trucks Cars Trucks Cyclists Totals Cars 6 325 333 0 48 191 5 1 197 39 0 41 Paisley Rd 277 2 Cyclists Trucks Cars Totals Paisley St 2 2 54 58 173 182 Trucks Cyclists Totals 4 81 85 0 Cars 308 268 282 Edinburgh Rd N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 463 Cars 76 372 32 480 West Peds: 3 Trucks 15 Trucks 0 14 1 15 South Peds: 12 West Entering: 325 1 Cyclists 0 Cyclists 1 0 South Entering: 496 West Leg Total: 658 Totals 478 Totals 77 South Leg Total: 974 **Comments**

#### Edinburgh Rd N @ Paisley Rd **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 From: 15:00:00 To: 18:00:00 To: 16:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000006 Edinburgh Rd N & Paisley Rd Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Edinburgh Rd N runs N/S North Leg Total: 1248 Cyclists 2 0 3 Cyclists 2 East Leg Total: 749 7 18 North Entering: 639 Trucks 2 Trucks 12 East Entering: 383 North Peds: 96 Cars 61 494 63 618 Cars 595 East Peds: 20 $\mathbb{Z}$ Peds Cross: Totals 65 504 70 Totals 609 Peds Cross: ⋈ Edinburgh Rd N Totals Cyclists Trucks Cars Trucks Cyclists Totals Cars 13 393 412 0 49 254 4 265 68 0 69 Paisley Rd 371 Cyclists Trucks Cars Totals Paisley St 4 80 84 7 9 225 241 74 75 Trucks Cyclists Totals 0 1 Cars 14 379 343 16 366 Edinburgh Rd N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 636 Cars 78 466 55 599 7 West Peds: Trucks 11 Trucks 4 0 12 South Peds: 17 8 West Entering: 400 Cyclists 0 2 0 2 Cyclists 1 South Entering: 613 West Leg Total: 812 Totals 82 South Leg Total: 1261 Totals 648 **Comments**

## Edinburgh Rd N @ Paisley Rd

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000006

Edinburgh Rd N & Paisley Rd Intersection:

TFR File #:

North Leg Total: 7343

North Entering: 3656

North Peds:

Peds Cross:

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Signalized Intersection \*\*

252

⋈

Cyclists 4 12 1 17 104

Trucks 10 58 36 346 Cars 451 2738

Totals 465 2808 383 Major Road: Edinburgh Rd N runs N/S

Cyclists 24 Trucks 98 Cars 3565

Totals 3687

East Leg Total: 4389 East Entering: 2183 East Peds: 66  $\mathbb{Z}$ Peds Cross:

Cyclists Trucks Cars Totals 22 66 2454 2542



Paisley Rd

Cyclists Trucks Cars Totals 13 502 519 45 1479 1552 10 532 546 4 2513





3535

Edinburgh Rd N



Trucks Cyclists Totals Cars 324 5 7 336 49 15 1542 0 305 22

Paisley St



Trucks Cyclists Totals Cars 2090 85 2206

 $\mathbb{X}$ Peds Cross: West Peds: 37 West Entering: 2617 West Leg Total: 5159

Cars 3569 Trucks 74 Cyclists 16 Totals 3659



Edinburgh Rd N

Cars 525 2739 265 3529 Trucks 7 4 91 80 Cyclists 3 2 13 18 Totals 535

Peds Cross:  $\bowtie$ South Peds: 76 South Entering: 3638 South Leg Total: 7297

#### Edinburgh Rd S @ Waterloo Ave **Specified Period Morning Peak Diagram One Hour Peak** From: 8:00:00 From: 7:00:00 To: 9:30:00 To: 9:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000007 Edinburgh Rd S & Waterloo Ave Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Edinburgh Rd S runs N/S North Leg Total: 860 Cyclists 0 0 9 Cyclists 1 East Leg Total: 576 14 2 North Entering: 366 Trucks 3 Trucks 15 East Entering: 242 East Peds: North Peds: Cars 18 287 38 343 Cars 478 11 $\mathbb{X}$ Peds Cross: Totals 21 305 40 Totals 494 Peds Cross: $\bowtie$ Edinburgh Rd S Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 6 146 152 0 0 32 105 0 108 98 0 102 Waterloo Ave 235 Cyclists Trucks Cars Totals Waterloo Ave 35 36 1 7 154 161 37 38 Trucks Cyclists Totals 0 1 Cars 226 321 12 334 Edinburgh Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 422 Cars 23 411 129 563 West Peds: 10 Trucks 14 Trucks 0 14 3 17 South Peds: 8 West Entering: 235 Cyclists 9 2 Cyclists 0 1 South Entering: 582 West Leg Total: 387 Totals 23 South Leg Total: 1027 Totals 445 **Comments**

#### Edinburgh Rd S @ Waterloo Ave Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 12:15:00 To: 13:30:00 To: 13:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000007 Edinburgh Rd S & Waterloo Ave Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Edinburgh Rd S runs N/S North Leg Total: 986 Cyclists 0 0 Cyclists 5 East Leg Total: 363 10 North Entering: 462 Trucks 0 10 0 Trucks 14 East Entering: 181 North Peds: East Peds: Cars 23 391 37 451 Cars 505 11 $\mathbb{X}$ Totals 524 Peds Cross: Totals 23 402 37 Peds Cross: $\bowtie$ Edinburgh Rd S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 5 128 138 0 0 41 67 3 5 75 62 1 65 Waterloo Ave 170 6 Cyclists Trucks Cars Totals Waterloo Ave 2 0 34 36 78 85 Trucks Cyclists Totals 32 32 0 0 Cars 5 3 144 173 182 Edinburgh Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 485 Cars 38 430 58 526 West Peds: 2 Trucks 12 Trucks 2 14 2 18 South Peds: 9 West Entering: 153 Cyclists 2 3 Cyclists 0 0 South Entering: 547 West Leg Total: 291 Totals 40 South Leg Total: 1046 Totals 499 **Comments**

#### Edinburgh Rd S @ Waterloo Ave **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 15:00:00 To: 18:00:00 To: 16:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000007 Edinburgh Rd S & Waterloo Ave Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Edinburgh Rd S runs N/S North Leg Total: 1256 Cyclists 0 0 6 Cyclists 2 East Leg Total: 512 10 North Entering: 633 Trucks 1 1 Trucks 16 East Entering: 285 North Peds: Cars 31 555 31 617 Cars 605 East Peds: 20 $\mathbb{Z}$ Totals 623 Peds Cross: Totals 32 32 Peds Cross: $\bowtie$ 569 Edinburgh Rd S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 6 197 207 0 46 127 5 2 134 103 0 105 Waterloo Ave 275 Cyclists Trucks Cars Totals Waterloo Ave 2 40 42 107 109 35 36 0 1 Cars Trucks Cyclists Totals 182 219 227 Edinburgh Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 693 Cars 39 520 81 640 West Peds: 11 Trucks 11 Trucks 0 13 4 17 South Peds: 12 West Entering: 187 Cyclists 6 Cyclists 2 2 5 1 South Entering: 662 West Leg Total: 394 Totals 710 Totals 41 South Leg Total: 1372 **Comments**

## Edinburgh Rd S @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000007

Intersection: Edinburgh Rd S & Waterloo Ave

TFR File #:

North Leg Total: 7921

North Entering: 3921

North Peds:

Peds Cross:

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Signalized Intersection \*\*

46

 $\bowtie$ 

Cyclists 0 29 0 Trucks 7 60 6 Cars 222 3331 266

Totals 229 272 3420

Major Road: Edinburgh Rd S runs N/S

Cyclists 19 Trucks 95 Cars 3886

Totals 4000

East Leg Total: 3287 East Entering: 1666 East Peds: 81  $\mathbb{X}$ Peds Cross:

Cyclists Trucks Cars Totals 16 39 1154 1209



Waterloo Ave

Cyclists	Trucks	Cars	Totals
2	4	255	261
11	26	255 722	759
4	4	255	263
17	34	1232	





29

73

3819

Edinburgh Rd S



Trucks Cyclists Totals Cars 300 5 0 305 755 717 27 11 583 20 3 606 1600

Waterloo Ave

Cars

Edinburgh Rd S		
-		

1555

Peds Cross:  $\bowtie$ South Peds: 83 South Entering: 4249 South Leg Total: 8538

Trucks Cyclists Totals

1621

 $\mathbb{X}$ Peds Cross: West Peds: 59 West Entering: 1283 West Leg Total: 2492

Cars 4169 Trucks 84 Cyclists 36 Totals 4289

Cars 215 3331 567 4113 Trucks 5 20 111 86 Cyclists 5 3 25 17 Totals 225 3434 590

## Edinburgh Rd S @ Wellington St W

#### **Specified Period One Hour Peak Morning Peak Diagram** From: 7:00:00 From: 8:15:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 800000008 Wellington St W & Edinburgh Rd S Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St W runs W/E North Leg Total: 1137 Cyclists 0 0 9 Cyclists 0 East Leg Total: 1414 2 18 North Entering: 495 Trucks 6 10 Trucks 24 East Entering: 592 North Peds: Cars 78 344 46 468 Cars 618 East Peds: 24 $\mathbb{Z}$ Totals 642 Peds Cross: Totals 84 Peds Cross: $\bowtie$ 363 48 Edinburgh Rd S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 30 627 657 57 0 61 412 20 0 432 95 0 99 Wellington St W 564 0 28 Cyclists Trucks Cars Totals Wellington St W 0 7 132 139 32 610 642 Trucks Cyclists Totals 10 129 140 1 Cars 778 49 871 44 0 822 Edinburgh Rd S $\mathbb{X}$ Peds Cross: Peds Cross: M Cars 568 Cars 137 429 122 688 West Peds: 5 Trucks 24 Trucks 4 27 South Peds: 8 13 10 West Entering: 921 0 Cyclists 10 Cyclists 0 0 South Entering: 715 West Leg Total: 1578 Totals 141 South Leg Total: 1317 Totals 602 132

# Edinburgh Rd S @ Wellington St W

#### **Specified Period One Hour Peak** Mid-day Peak Diagram From: 11:00:00 **From:** 12:00:00 To: 13:30:00 To: 13:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 800000008 Wellington St W & Edinburgh Rd S Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St W runs W/E North Leg Total: 1089 Cyclists 0 0 3 Cyclists 4 East Leg Total: 1185 15 North Entering: 542 Trucks 2 10 3 Trucks 14 East Entering: 640 North Peds: 0 Cars 57 412 55 524 Cars 529 East Peds: 13 $\mathbb{X}$ Totals 547 Peds Cross: Totals 59 425 Peds Cross: $\bowtie$ 58 Edinburgh Rd S Cyclists Trucks Cars Totals Trucks Cyclists Totals Cars 37 549 586 1 0 65 387 33 0 420 150 0 155 Wellington St W 0 601 39 Cyclists Trucks Cars Totals Wellington St W 4 77 81 0 22 326 348 4 95 100 Trucks Cyclists Totals 1 Cars 30 498 515 30 0 545 Edinburgh Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 657 Cars 105 388 134 627 West Peds: 3 Trucks 19 Trucks 2 9 5 16 South Peds: 2

### **Comments**

Cyclists 0

Totals 107

4

South Entering: 647

South Leg Total: 1327

0

139

West Entering: 529

West Leg Total: 1115

Cyclists 4

Totals 680

#### Edinburgh Rd S @ Wellington St W **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:15:00 To: 18:00:00 To: 17:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 800000008 Wellington St W & Edinburgh Rd S Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St W runs W/E North Leg Total: 1460 Cyclists 0 0 8 Cyclists 6 East Leg Total: 1697 7 North Entering: 751 Trucks 4 3 0 Trucks 6 East Entering: 886 Cars 697 North Peds: 5 Cars 90 592 54 736 East Peds: 16 $\mathbb{X}$ Peds Cross: Totals 94 54 Totals 709 Peds Cross: $\bowtie$ 603 Edinburgh Rd S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 22 902 926 68 3 0 71 650 633 17 0 162 3 0 165 Wellington St W 863 0 23 Cyclists Trucks Cars Totals Wellington St W 0 0 105 105 20 569 589 169 169 Trucks Cyclists Totals 0 0 Cars 20 843 788 23 0 811 Edinburgh Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 923 Cars 179 524 165 868 West Peds: 14 Trucks 6 Trucks 1 3 7 South Peds: 10 3 West Entering: 863 Cyclists 2 Cyclists 8 0 8 South Entering: 883 West Leg Total: 1789 Totals 182 South Leg Total: 1820 Totals 937 168

## Edinburgh Rd S @ Wellington St W

## **Total Count Diagram**

Municipality: Guelph

**Site #:** 0000000008

Intersection: Wellington St W & Edinburgh Rd S

TFR File #: 8

Count date: 14-Sep-2021

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Signalized Intersection \*\*

tion \*\* Major Road: Wellington St W runs W/E

North Leg Total: 9131 North Entering: 4574

 Cyclists
 1
 44
 0

 Trucks
 33
 60
 8

 Cars
 627
 3359
 442

 Totals
 661
 3463
 450

45 101 4428

Cyclists 28

Trucks 122

Cars 4407

Totals 4557

East Leg Total: 10774
East Entering: 5310
East Peds: 144
Peds Cross: \$\mathbb{X}\$

Cyclists Trucks Cars Totals
8 208 5281 5497



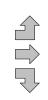


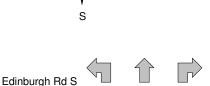


Trucks Cyclists Totals Cars 439 15 0 454 3645 154 0 3799 1015 41 1 1057 5099 210

Wellington St W

Cyclists	Trucks	Cars	Totals
0	44	733	777
1	192	3684	3877
5	42	944	991
6	278	5361	





Cars Trucks Cyclists Totals
5213 248 3 5464

Wellington St W

Peds Cross: \$\textstyle{\mathbb{X}}\$

West Peds: 68

West Entering: 5645

West Leg Total: 11142

 Cars
 5318

 Trucks
 143

 Cyclists
 50

 Totals
 5511

 Cars
 1009
 3235
 1087
 5331

 Trucks
 21
 63
 48
 132

 Cyclists
 7
 28
 2
 37

 Totals
 1037
 3326
 1137

Peds Cross: 
South Peds: 49

South Entering: 5500

South Leg Total: 11011

#### Glasgow St N @ Paisley St **Morning Peak Diagram Specified Period One Hour Peak** From: 8:00:00 From: 7:00:00 To: 9:30:00 To: 9:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000011 Paisley St & Glasgow St N Person(s) who counted: Intersection: Cam TFR File #: 11 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Paisley St runs W/E Cyclists 1 North Leg Total: 110 0 6 Cyclists 4 East Leg Total: 484 2 North Entering: 62 Trucks 2 0 Trucks 1 East Entering: 221 North Peds: East Peds: 42 Cars 10 32 12 54 Cars 43 12 $\mathbb{X}$ Totals 13 Peds Cross: 37 12 Totals 48 Peds Cross: ⋈ Glasgow St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 10 216 227 0 197 0 205 7 0 Paisley St 213 0 Cyclists Trucks Cars Totals Paisley St 0 8 8 0 4 11 212 227 5 6 Trucks Cyclists Totals 0 1 Cars 4 12 225 248 263 Glasgow St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 44 Cars 9 24 59 West Peds: 1 Trucks 1 Trucks 0 0 1 South Peds: 23 1 West Entering: 241 Cyclists 5 0 4 Cyclists 0 South Entering: 64 West Leg Total: 468 Totals 9 South Leg Total: 114 Totals 50 **Comments**

### Glasgow St N @ Paisley St Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000011 Paisley St & Glasgow St N Person(s) who counted: Intersection: Cam TFR File #: 11 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Paisley St runs W/E Cyclists 0 North Leg Total: 58 0 Cyclists 2 East Leg Total: 553 North Entering: 24 Trucks 0 0 East Entering: 0 Trucks 0 278 North Peds: Cars 32 East Peds: 114 Cars 9 14 0 23 7 $\mathbb{X}$ Peds Cross: Totals 9 0 Totals 34 Peds Cross: ⋈ 15 Glasgow St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 9 276 287 0 258 2 269 7 0 Paisley St 267 2 Cyclists Trucks Cars Totals Paisley St 0 3 4 4 7 258 269 0 6 Trucks Cyclists Totals 0 6 Cars 5 267 264 275 Glasgow St N $\mathbb{X}$ Peds Cross: 42 Peds Cross: $\bowtie$ Cars 27 Cars 9 6 0 West Peds: 5 Trucks 0 Trucks 0 0 0 South Peds: 110 West Entering: 279 Cyclists 0 1 Cyclists 1 0 South Entering: 43 West Leg Total: 566 Totals 9 South Leg Total: 71 Totals 28 **Comments**

### Glasgow St N @ Paisley St **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:15:00 To: 18:00:00 To: 17:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000011 Paisley St & Glasgow St N Person(s) who counted: Intersection: Cam TFR File #: 11 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Paisley St runs W/E Cyclists 0 North Leg Total: 74 0 3 Cyclists 4 East Leg Total: 687 North Entering: 31 Trucks 0 0 East Entering: 0 Trucks 0 371 North Peds: Cars 39 East Peds: Cars 7 17 4 28 8 11 $\mathbb{X}$ Totals 7 Peds Cross: 20 4 Totals 43 Peds Cross: ⋈ Glasgow St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 6 360 370 0 350 341 6 3 14 2 16 Paisley St 360 5 Cyclists Trucks Cars Totals Paisley St 0 13 14 281 294 12 Trucks Cyclists Totals 1 0 11 Cars 302 305 10 316 Glasgow St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 42 Cars 12 17 50 7 West Peds: Trucks 0 Trucks 0 0 1 1 South Peds: 19 West Entering: 320 4 Cyclists 6 Cyclists 1 0 South Entering: 55 West Leg Total: 690 Totals 13 South Leg Total: 103 Totals 48 **Comments**

## Glasgow St N @ Paisley St

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000011

Intersection: Paisley St & Glasgow St N

TFR File #: 11

North Leg Total: 560

North Entering: 252

North Peds:

Peds Cross:

Count date: 14-Sep-2021

398

⋈

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

232

Glasgow St N

### \*\* Non-Signalized Intersection \*\*

Cyclists 1 14 0 15 5 Trucks 4 0

Cars 56 146 30 Totals 61 161 30 Cyclists 17 Trucks 5

Major Road: Paisley St runs W/E

Cars 286 Totals 308 East Leg Total: 4261 East Entering: 2026 East Peds: 71  $\mathbb{X}$ 

Peds Cross:

Cyclists Trucks Cars Totals 18 62 1971 2051

59

43

2004

2106

Paisley St

Totals

61

51

2108

Trucks Cyclists Totals Cars 3 0 48 1838 57 14 1909 66 3 69 1949 17

Cars

2126

87

Glasgow St N

Paisley St

 $\mathbb{X}$ Peds Cross: West Peds: 32 West Entering: 2220 West Leg Total: 4271

Cyclists Trucks Cars

0

85

6

2

19

2

23

Cars 255 Trucks 7 Cyclists 19 Totals 281

Cars 77 182 92 351 Trucks 1 2 2 5 Cyclists 3 3 21 15 Totals 81

Peds Cross:  $\bowtie$ South Peds: 303 South Entering: 377 South Leg Total: 658

Trucks Cyclists Totals

2235

### Glasgow St S @ Waterloo Ave **Morning Peak Diagram Specified Period One Hour Peak** From: 7:00:00 From: 8:15:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000012 Intersection: Waterloo Ave & Glasgow St S Person(s) who counted: Cam TFR File #: 12 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 167 1 Cyclists 2 East Leg Total: 449 North Entering: 74 Trucks 0 0 Trucks 1 East Entering: 172 North Peds: Cars 90 16 Cars 39 5 25 69 East Peds: 20 $\mathbb{X}$ Peds Cross: Totals 39 26 Totals 93 Peds Cross: $\bowtie$ Glasgow St S Totals Cyclists Trucks Cars Cars Trucks Cyclists Totals 169 177 24 125 6 0 131 16 0 17 Waterloo Ave 164 Cyclists Trucks Cars Totals Waterloo Ave 0 0 50 50 2 11 235 248 8 Trucks Cyclists Totals 0 0 8 Cars 293 263 277 Glasgow St S $\mathbb{X}$ Peds Cross: 25 Peds Cross: $\bowtie$ Cars 29 Cars 5 3 West Peds: 10 Trucks 2 Trucks 1 0 2 South Peds: 17 2 West Entering: 306 Cyclists 3 Cyclists 1 0 South Entering: 29 West Leg Total: 483 Totals 7 South Leg Total: 63 Totals 34 **Comments**

#### Glasgow St S @ Waterloo Ave Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 12:30:00 To: 13:30:00 To: 13:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000012 Intersection: Waterloo Ave & Glasgow St S Person(s) who counted: Cam TFR File #: 12 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 96 1 Cyclists 2 East Leg Total: 386 East Entering: North Entering: 49 Trucks 1 0 Trucks 0 176 North Peds: East Peds: 10 Cars 26 5 16 47 Cars 45 5 $\mathbb{X}$ Totals 47 Peds Cross: Totals 27 17 Peds Cross: ⋈ Glasgow St S Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 6 164 175 0 0 22 134 5 4 143 0 11 11 Waterloo Ave 167 Cyclists Trucks Cars Totals Waterloo Ave 0 0 17 17 7 171 178 10 11 Trucks Cyclists Totals 0 1 Cars 198 200 210 Glasgow St S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 26 Cars 4 13 23 West Peds: 10 Trucks 1 Trucks 0 0 2 2 South Peds: 14 West Entering: 206 3 Cyclists 0 Cyclists 1 0 South Entering: 28 West Leg Total: 381 Totals 5 South Leg Total: 55 Totals 27 **Comments**

#### Glasgow St S @ Waterloo Ave **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 15:45:00 To: 18:00:00 To: 16:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000012 Intersection: Waterloo Ave & Glasgow St S Person(s) who counted: Cam TFR File #: 12 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 145 0 2 Cyclists 8 East Leg Total: 486 2 1 East Entering: North Entering: 72 Trucks 0 Trucks 0 259 East Peds: North Peds: Cars 36 25 68 Cars 65 4 $\mathbb{X}$ Totals 73 Peds Cross: Totals 36 10 26 Peds Cross: ⋈ Glasgow St S Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 5 260 268 26 0 2 28 215 223 5 3 8 0 8 Waterloo Ave 249 5 Cyclists Trucks Cars Totals Waterloo Ave 0 0 30 30 2 178 186 0 4 Trucks Cyclists Totals 0 Cars 3 212 217 227 Glasgow St S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 19 Cars 9 14 32 4 West Peds: Trucks 1 Trucks 0 0 0 0 South Peds: 9 7 West Entering: 220 Cyclists 2 Cyclists 0 1 South Entering: 39 West Leg Total: 488 Totals 9 South Leg Total: 61 Totals 22 **Comments**

## Glasgow St S @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000012

Intersection: Waterloo Ave & Glasgow St S

TFR File #: 12

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

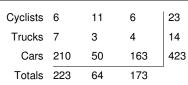
Person(s) who counted:

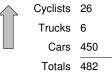
Cam

### \*\* Non-Signalized Intersection \*\*

Major Road: Waterloo Ave runs W/E

North Leg Total: 942 North Entering: 460 North Peds: 87 Peds Cross:  $\bowtie$ 





East Leg Total: 3120 East Entering: 1466 East Peds: 79  $\mathbb{X}$ Peds Cross:

Cyclists Trucks Cars Totals 32 52 1424 1508





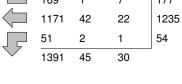
Waterloo Ave





Cyclists	Trucks	Cars	Totals
3	4	204 1336	211
21	44		1401
2	1	48	51
26	49	1588	





Glasgow St S

Cars	Trucks	Cyclists	Totals
1572	52	30	1654

 $\mathbb{X}$ Peds Cross: West Peds: 51 West Entering: 1663 West Leg Total: 3171

Cars	149
Trucks	6
Cyclists	14
Totals	169



Peds Cross:  $\bowtie$ South Peds: 100 South Entering: 224 South Leg Total: 393

#### Gordon St @ Wellington St **Morning Peak Diagram Specified Period One Hour Peak** From: 8:15:00 From: 7:00:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000016 Intersection: Wellington St & Gordon St Person(s) who counted: Cam TFR File #: 16 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St runs W/E North Leg Total: 1053 Cyclists 0 15 1 16 Cyclists 4 East Leg Total: 1733 24 North Entering: 497 Trucks 3 19 2 Trucks 19 East Entering: 789 North Peds: 13 Cars 42 350 65 457 Cars 533 East Peds: 15 $\mathbb{X}$ Totals 556 Peds Cross: Totals 45 Peds Cross: $\bowtie$ 384 68 Gordon St Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 33 555 589 70 1 0 71 468 26 1 495 2 223 211 10 Wellington St W 749 3 Cyclists Trucks Cars Totals Wellington St E 4 122 126 0 37 636 673 58 59 Trucks Cyclists Totals 0 1 Cars 42 816 900 42 944 Gordon St $\mathbb{X}$ Peds Cross: 585 Peds Cross: $\bowtie$ Cars 619 Cars 45 341 199 West Peds: 23 Trucks 30 Trucks 4 14 3 21 South Peds: 9 West Entering: 858 5 South Entering: 611 Cyclists 17 Cyclists 0 4 1 West Leg Total: 1447 Totals 49 South Leg Total: 1277 Totals 666 203 **Comments**

#### Gordon St @ Wellington St Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000016 Intersection: Wellington St & Gordon St Person(s) who counted: Cam TFR File #: 16 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St runs W/E North Leg Total: 1089 Cyclists 0 0 8 Cyclists 2 East Leg Total: 1631 17 North Entering: 554 Trucks 4 13 0 Trucks 15 East Entering: 862 North Peds: 27 Cars 70 366 93 529 Cars 518 East Peds: 24 $\mathbb{Z}$ Totals 74 Totals 535 Peds Cross: 387 93 Peds Cross: ⋈ Gordon St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 36 627 665 97 1 0 98 466 30 2 498 257 2 266 Wellington St W 820 Cyclists Trucks Cars Totals Wellington St E 0 4 111 115 3 26 454 483 2 60 62 Trucks Cyclists Totals 0 Cars 3 731 3 32 625 35 769 Gordon St $\mathbb{X}$ Peds Cross: 585 Peds Cross: $\bowtie$ Cars 683 Cars 91 310 184 West Peds: 38 Trucks 22 Trucks 2 10 9 21 South Peds: 17 West Entering: 660 Cyclists 0 2 0 2 Cyclists 10 South Entering: 608 West Leg Total: 1325 Totals 715 Totals 93 South Leg Total: 1323 193 **Comments**

#### Gordon St @ Wellington St **Specified Period Afternoon Peak Diagram One Hour Peak** From: 15:00:00 **From:** 16:15:00 To: 18:00:00 To: 17:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000016 Intersection: Wellington St & Gordon St Person(s) who counted: Cam TFR File #: 16 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St runs W/E North Leg Total: 1261 Cyclists 1 0 8 Cyclists 10 East Leg Total: 2201 11 North Entering: 634 Trucks 1 10 0 Trucks 12 East Entering: 1091 North Peds: East Peds: 20 Cars 83 455 77 615 Cars 605 49 $\mathbb{Z}$ 77 Totals 627 Peds Cross: Totals 85 472 Peds Cross: ⋈ Gordon St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 21 891 915 2 0 66 721 702 17 2 297 0 304 Wellington St W 1063 26 Cyclists Trucks Cars Totals Wellington St E 1 0 88 89 2 22 740 764 0 41 41 Trucks Cyclists Totals 0 Cars 2 22 869 1080 28 1110 Gordon St $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 793 Cars 106 453 263 822 West Peds: 36 Trucks 17 Trucks 3 10 6 19 South Peds: 41 West Entering: 894 Cyclists 7 0 9 Cyclists 0 9 South Entering: 850 West Leg Total: 1809 Totals 109 South Leg Total: 1667 Totals 817 269 **Comments**

## Gordon St @ Wellington St

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000016

Intersection: Wellington St & Gordon St

TFR File #: 16

North Leg Total: 8319

North Entering: 4225

North Peds:

Peds Cross:

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Signalized Intersection \*\*

151

 $\bowtie$ 

79 Cyclists 2 75 2 Trucks 18 111 11

3148

566

2962 Cars 491 553 Totals 511

140 4006

Gordon St

Cyclists 48 Trucks 130 Cars 3916

Totals 4094

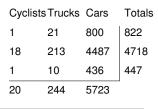
Major Road: Wellington St runs W/E

East Leg Total: 13801 East Entering: 6842 East Peds: 227  $\mathbb{Z}$ Peds Cross:

Cyclists Trucks Cars Totals 15 209 5275 5499

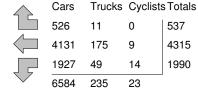


Wellington St W









Wellington St E



Cars	Trucks	Cyclists	Totals
6663	264	32	6959

 $\mathbb{X}$ Peds Cross: West Peds: 257 West Entering: 5987 West Leg Total: 11486

Cars 5325 Trucks 170 Cyclists 90 Totals 5585



Cars 653 2590 1623 4866 Trucks 16 40 154 98 63 Cyclists 4 47 12 Totals 673 2735 1675

Peds Cross:  $\bowtie$ South Peds: 186 South Entering: 5083 South Leg Total: 10668

### Norfolk St @ Cork St **Specified Period Morning Peak Diagram One Hour Peak** From: 8:15:00 From: 7:00:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000014 Intersection: Norfolk St & Cork St Person(s) who counted: Cam TFR File #: 14 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Norfolk St runs N/S Cyclists 0 North Leg Total: 1187 14 0 14 Cyclists 2 East Leg Total: 97 North Entering: 634 Trucks 0 2 26 24 Trucks 21 East Entering: North Peds: Cars 23 552 19 594 Cars 530 East Peds: 36 $\mathbb{X}$ Totals 23 Totals 553 Peds Cross: 590 21 Peds Cross: $\bowtie$ Norfolk St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 3 64 67 0 0 17 3 0 5 13 0 14 Cork St W 33 0 Cyclists Trucks Cars Totals Cork St E 0 0 1 5 25 26 Trucks Cyclists Totals 0 1 Cars 5 0 31 56 61 Norfolk St $\mathbb{X}$ Peds Cross: 582 Peds Cross: $\bowtie$ Cars 590 Cars 38 512 32 West Peds: 23 Trucks 26 Trucks 1 21 2 24 South Peds: 2 West Entering: 33 Cyclists 0 2 2 Cyclists 14 0 South Entering: 608 West Leg Total: 100 Totals 39 South Leg Total: 1238 Totals 630 **Comments**

### Norfolk St @ Cork St Mid-day Peak Diagram **Specified Period One Hour Peak** From: 12:00:00 From: 11:00:00 To: 13:30:00 To: 13:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000014 Intersection: Norfolk St & Cork St Person(s) who counted: Cam TFR File #: 14 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Norfolk St runs N/S Cyclists 0 North Leg Total: 1189 2 9 Cyclists 4 East Leg Total: 154 North Entering: 634 Trucks 1 16 East Entering: 15 0 Trucks 25 70 North Peds: Cars 13 559 37 609 Cars 526 East Peds: 38 $\mathbb{X}$ Totals 555 Peds Cross: Totals 14 581 Peds Cross: $\bowtie$ 39 Norfolk St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 32 33 2 0 39 0 0 1 0 30 29 Cork St W Cyclists Trucks Cars Totals Cork St E 0 2 3 2 16 Trucks Cyclists Totals 1 13 Cars 3 2 19 82 84 Norfolk St $\mathbb{X}$ Peds Cross: 546 Peds Cross: $\bowtie$ Cars 601 Cars 18 487 41 West Peds: 92 Trucks 17 Trucks 0 23 0 23 South Peds: 3 West Entering: 23 Cyclists 9 Cyclists 0 3 South Entering: 572 3 0 West Leg Total: 56 Totals 18 South Leg Total: 1199 Totals 627 **Comments**

### Norfolk St @ Cork St **Afternoon Peak Diagram Specified Period One Hour Peak** From: 16:30:00 From: 15:00:00 17:30:00 To: 18:00:00 To: Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000014 Intersection: Norfolk St & Cork St Person(s) who counted: Cam TFR File #: 14 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Norfolk St runs N/S Cyclists 0 North Leg Total: 1337 1 Cyclists 8 East Leg Total: 137 9 North Entering: 665 Trucks 0 East Entering: 0 Trucks 12 North Peds: East Peds: 2 Cars 14 615 20 649 Cars 652 36 $\mathbb{X}$ Peds Cross: Totals 14 630 21 Totals 672 Peds Cross: ⋈ Norfolk St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 0 31 31 0 2 47 6 0 0 6 25 1 26 Cork St W 76 3 Cyclists Trucks Cars Totals Cork St E 0 0 3 3 2 2 31 Trucks Cyclists Totals 0 0 31 Cars 57 36 58 Norfolk St $\mathbb{X}$ Peds Cross: 650 Peds Cross: $\bowtie$ Cars 671 Cars 11 604 35 West Peds: 34 Trucks 9 Trucks 0 12 0 12 South Peds: 1 West Entering: 36 Cyclists 7 Cyclists 0 0 6 South Entering: 668 6 West Leg Total: 67 Totals 11 South Leg Total: 1355 Totals 687 **Comments**

## Norfolk St @ Cork St

## **Total Count Diagram**

Municipality: Guelph

**Site #:** 0000000014

Intersection: Norfolk St & Cork St

TFR File #: 14

Count date: 14-Sep-2021

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Non-Signalized Intersection \*\*

Major Road: Norfolk St runs N/S

 Cyclists
 1
 59
 9
 69

 Trucks
 5
 133
 5
 143

 Cars
 106
 4160
 192
 445

 Totals
 112
 4352
 206

69 Cyclists 42
143 Trucks 139
4458 Cars 4084
Totals 4265

Cyclists Trucks Cars Totals
1 9 276 286





Norfolk St



 Cars
 Trucks
 Cyclists Totals

 241
 5
 6
 252

 25
 2
 0
 27

 150
 4
 2
 156

 416
 11
 8

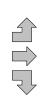
 Cyclists Trucks Cars
 Totals

 1
 1
 18
 20

 0
 2
 20
 22

 2
 3
 153
 158

 3
 6
 191



Cork St W

W E

Norfolk St

Cars Trucks Cyclists Totals

15

Cork St E

437

Peds Cross: 

West Peds: 336

West Entering: 200

West Leg Total: 486

 Cars
 4463

 Trucks
 140

 Cyclists
 63

 Totals
 4666

 Cars
 145
 3825
 225
 4195

 Trucks
 2
 133
 8
 143

 Cyclists
 0
 35
 0
 35

 Totals
 147
 3993
 233

Peds Cross: 
South Peds: 24

South Entering: 4373

South Leg Total: 9039

9

461

#### Norfolk St @ Paisley St **Morning Peak Diagram Specified Period One Hour Peak** From: 8:30:00 **From:** 7:00:00 To: 9:30:00 To: 9:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000013 Intersection: Norfolk St & Paisley St Person(s) who counted: Cam TFR File #: 13 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Norfolk St runs N/S North Leg Total: 957 Cyclists 0 11 0 11 Cyclists 2 East Leg Total: 393 16 East Entering: North Entering: 523 Trucks 0 16 0 Trucks 15 217 North Peds: East Peds: 81 Cars 33 431 32 496 Cars 417 52 $\mathbb{X}$ Totals 434 Peds Cross: Totals 33 458 32 Peds Cross: $\bowtie$ Norfolk St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 237 245 0 0 38 95 5 1 101 75 1 78 Paisley St 208 2 Cyclists Trucks Cars Totals Quebec St 0 73 73 11 68 79 2 113 116 Trucks Cyclists Totals 1 Cars 0 13 254 163 13 176 Norfolk St $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 619 Cars 109 306 63 478 West Peds: 43 Trucks 20 Trucks 2 15 2 19 South Peds: 63 West Entering: 268 Cyclists 0 2 2 Cyclists 13 0 South Entering: 499 West Leg Total: 513 Totals 111 South Leg Total: 1151 Totals 652 **Comments**

#### Norfolk St @ Paisley St Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000013 Intersection: Norfolk St & Paisley St Person(s) who counted: Cam TFR File #: 13 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Norfolk St runs N/S North Leg Total: 948 Cyclists 1 1 10 Cyclists 7 East Leg Total: 489 Trucks 0 2 11 North Entering: 449 Trucks 19 East Entering: 262 North Peds: 144 Cars 50 349 29 428 Cars 473 East Peds: 84 $\mathbb{Z}$ Peds Cross: Totals 51 32 Totals 499 Peds Cross: $\bowtie$ 366 Norfolk St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 11 289 301 2 44 131 5 0 136 79 1 82 Paisley St 251 3 Cyclists Trucks Cars Totals Quebec St 88 89 1 1 5 102 108 117 121 Trucks Cyclists Totals 3 1 Cars 4 307 215 10 227 Norfolk St $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 545 Cars 108 344 84 536 West Peds: 105 Trucks 12 Trucks 6 17 3 26 South Peds: 145 West Entering: 318 5 Cyclists 12 Cyclists 0 5 0 South Entering: 567 West Leg Total: 619 Totals 114 South Leg Total: 1136 Totals 569 **Comments**

#### Norfolk St @ Paisley St **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:30:00 To: 18:00:00 To: 17:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000013 Intersection: Norfolk St & Paisley St Person(s) who counted: Cam TFR File #: 13 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Norfolk St runs N/S North Leg Total: 1097 Cyclists 3 2 11 Cyclists 8 East Leg Total: 502 7 0 8 East Entering: North Entering: 483 Trucks 1 Trucks 12 317 North Peds: Cars 40 East Peds: 40 402 22 464 Cars 594 33 $\mathbb{X}$ Totals 614 Peds Cross: Totals 44 415 24 Peds Cross: $\bowtie$ Norfolk St Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 334 342 0 44 165 1 169 104 0 104 Paisley St 309 5 Cyclists Trucks Cars Totals Quebec St 0 102 103 3 98 107 106 110 Trucks Cyclists Totals 3 1 Cars 306 173 6 185 Norfolk St $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 612 Cars 129 452 53 634 West Peds: 55 Trucks 8 Trucks 0 11 0 11 South Peds: 92 West Entering: 320 Cyclists 9 5 Cyclists 0 1 South Entering: 650 West Leg Total: 662 Totals 129 South Leg Total: 1279 Totals 629 **Comments**

# Norfolk St @ Paisley St

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000013

Intersection: Norfolk St & Paisley St

TFR File #: 13

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

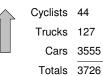
## \*\* Signalized Intersection \*\*

North Leg Total: 7272 North Entering: 3546 North Peds: 505

Peds Cross:  $\bowtie$ 

Cyclists	9	48	7	
Trucks	13	109	4	
Cars	299	2871	186	
Totals	321	3028	197	_

64 126 3356



Major Road: Norfolk St runs N/S

East Leg Total: 3335 East Entering: 1894 East Peds: 400  $\mathbb{Z}$ Peds Cross:

Cyclists Trucks Cars Totals 20 64 1995 2079



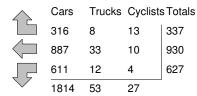


Paisley St









Cyclists Trucks Cars Totals 12 614 629

12 64 699 775 16 817 844 11 26 2130





Quebec St



Trucks Cyclists Totals Cars 1341 79 1441

 $\mathbb{X}$ Peds Cross: West Peds: 426 West Entering: 2248 West Leg Total: 4327

Cars 4299 Trucks 137 Cyclists 63 Totals 4499



Cars 809 2625 456 3890 Trucks 18 107 136 11 2 31 Cyclists 1 28 Totals 828 2760

Peds Cross:  $\bowtie$ South Peds: 698 South Entering: 4057 South Leg Total: 8556

### **Comments**

#### Norfolk St @ Waterloo Ave **Morning Peak Diagram Specified Period One Hour Peak** From: 8:15:00 **From:** 7:00:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000015 Intersection: Norfolk St & Waterloo Ave Person(s) who counted: Cam TFR File #: 15 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Norfolk St runs N/S Cyclists 1 North Leg Total: 1248 0 10 Cyclists 3 East Leg Total: 18 Trucks 3 21 East Entering: North Entering: 621 18 0 Trucks 24 East Peds: North Peds: 16 Cars 96 494 0 590 Cars 600 7 $\mathbb{X}$ Totals 627 Peds Cross: Totals 100 0 Peds Cross: ⋈ 521 Norfolk St Trucks Cyclists Totals Cyclists Trucks Cars Totals 6 175 185 0 2 5 11 Waterloo Ave Cyclists Trucks Cars Totals Wilson St 7 165 172 0 0 0 0 2 110 115 3 Cars Trucks Cyclists Totals 0 10 275 Gordon St $\mathbb{X}$ Peds Cross: 510 Peds Cross: $\bowtie$ Cars 611 Cars 76 434 West Peds: 28 Trucks 22 Trucks 3 17 0 20 South Peds: 21 West Entering: 287 5 Cyclists 14 Cyclists 1 3 South Entering: 535 West Leg Total: 472 Totals 80 South Leg Total: 1182 Totals 647 **Comments**

#### Norfolk St @ Waterloo Ave Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000015 Intersection: Norfolk St & Waterloo Ave Person(s) who counted: Cam TFR File #: 15 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Norfolk St runs N/S Cyclists 1 North Leg Total: 1182 0 9 Cyclists 1 East Leg Total: 49 Trucks 2 15 North Entering: 603 13 0 Trucks 21 East Entering: 42 North Peds: 16 Cars 75 504 0 579 Cars 557 East Peds: 15 $\mathbb{X}$ Totals 78 Totals 579 Peds Cross: 525 0 Peds Cross: ⋈ Norfolk St 7 Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 5 148 159 0 10 0 4 14 21 2 23 Waterloo Ave 35 6 Cyclists Trucks Cars Totals Wilson St 106 110 0 4 4 0 4 2 5 103 96 Cars Trucks Cyclists Totals 0 7 7 202 Gordon St $\mathbb{X}$ Peds Cross: 510 Peds Cross: $\bowtie$ Cars 621 Cars 63 447 West Peds: 79 Trucks 18 Trucks 3 16 0 19 South Peds: 59 West Entering: 217 5 Cyclists 12 Cyclists 1 3 South Entering: 534 West Leg Total: 376 Totals 67 South Leg Total: 1185 Totals 651 **Comments**

#### Norfolk St @ Waterloo Ave **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:00:00 To: 18:00:00 To: 17:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000015 Intersection: Norfolk St & Waterloo Ave Person(s) who counted: Cam TFR File #: 15 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Norfolk St runs N/S Cyclists 0 North Leg Total: 1327 0 1 Cyclists 5 East Leg Total: 50 Trucks 2 14 North Entering: 663 12 0 Trucks 15 East Entering: Cars 644 North Peds: 12 Cars 132 516 0 648 East Peds: 10 $\mathbb{X}$ Totals 664 Peds Cross: Totals 134 529 0 Peds Cross: ⋈ Norfolk St Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 6 251 263 0 2 19 24 17 1 18 Waterloo Ave 38 Cyclists Trucks Cars Totals Wilson St 0 3 125 128 2 2 4 110 115 Trucks Cyclists Totals 1 Cars 0 235 6 6 Gordon St $\mathbb{X}$ Peds Cross: 617 Peds Cross: $\bowtie$ Cars 643 Cars 100 517 West Peds: 23 Trucks 16 Trucks 3 12 0 15 South Peds: 55 West Entering: 245 Cyclists 3 Cyclists 2 11 5 4 South Entering: 643 West Leg Total: 508 Totals 105 South Leg Total: 1305 Totals 662 **Comments**

## Norfolk St @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000015

Intersection: Norfolk St & Waterloo Ave

TFR File #: 15

North Leg Total: 8964

North Entering: 4563

North Peds:

Peds Cross:

Count date: 14-Sep-2021

87

Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

## \*\* Non-Signalized Intersection \*\*

Cyclists 6 43 140 Trucks 18 122 0 Cars 715 3659 0 4374

0

Totals 739 3824 0 Major Road: Norfolk St runs N/S

Cyclists 23

Trucks 155 Cars 4223

Totals 4401

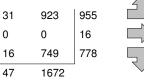
East Leg Total: 337 East Entering: 305 East Peds: 73  $\mathbb{X}$ Peds Cross:

Cyclists Trucks Cars Totals 42 1316 1388





Cyclis	sts Trucks	Cars	Total
1	31	923	955
16	0	0	16
13	16	749	778
30	47	1672	_



 $\mathbb{X}$ Peds Cross: West Peds: 266 West Entering: 1749 West Leg Total: 3137



Cars 4549 Trucks 141 Cyclists 75 Totals 4765



49

Norfolk St





Trucks Cyclists Totals Cars 0 20 122 102 17 141 19 163 262 36

Wilson St



3780 Cars 499 3281 Trucks 21 123 0 144 Cyclists 7 22 45 16 Totals 527 3426

Trucks Cyclists Totals Cars 0 32 32

> Peds Cross:  $\bowtie$ South Peds: 275 South Entering: 3969 South Leg Total: 8734

### **Comments**

#### Silvercreek Pkwy N @ Paisley Rd **Specified Period One Hour Peak Morning Peak Diagram** From: 8:00:00 From: 7:00:00 To: 9:30:00 To: 9:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000001 Paisley Rd & Silvercreek Pkwy N Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley Rd runs W/E North Leg Total: 576 Cyclists 1 7 8 Cyclists 1 East Leg Total: 886 9 North Entering: 245 Trucks 5 4 Trucks 16 East Entering: 449 North Peds: 44 Cars 98 129 228 Cars 314 East Peds: 22 $\mathbb{X}$ Totals 331 Peds Cross: Peds Cross: $\bowtie$ Totals 104 140 Silvercreek Pkwy N Totals Cyclists Trucks Cars Cars Trucks Cyclists Totals 12 401 415 129 137 303 1 311 0 1 Paisley Rd 433 2 Cyclists Trucks Cars Totals Paisley Rd 9 181 190 0 4 14 278 296 Trucks Cyclists Totals 0 0 1 Cars 4 23 460 408 18 437 Silvercreek Pkwy N $\mathbb{X}$ Peds Cross: 5 Peds Cross: $\bowtie$ Cars 3 Cars 0 0 West Peds: 13 Trucks 0 Trucks 0 0 0 South Peds: 19 0 West Entering: 487 South Entering: 5 Cyclists 0 Cyclists 0 0 West Leg Total: 902 Totals 0 South Leg Total: 8 Totals 3 **Comments**

#### Silvercreek Pkwy N @ Paisley Rd Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 12:00:00 To: 13:30:00 To: 13:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000001 Paisley Rd & Silvercreek Pkwy N Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley Rd runs W/E North Leg Total: 656 Cyclists 0 3 3 Cyclists 1 East Leg Total: 728 3 2 North Entering: 326 Trucks 1 Trucks 9 East Entering: 352 East Peds: North Peds: 15 Cars 166 4 150 320 Cars 320 2 $\mathbb{X}$ Totals 330 Peds Cross: Totals 167 Peds Cross: $\bowtie$ 155 Silvercreek Pkwy N Totals Cyclists Trucks Cars Cars Trucks Cyclists Totals 5 373 379 132 140 207 1 212 0 0 0 Paisley Rd 339 2 Cyclists Trucks Cars Totals Paisley Rd 186 187 1 213 220 Trucks Cyclists Totals 2 3 0 1 Cars 401 364 376 Silvercreek Pkwy N $\mathbb{X}$ Peds Cross: 3 Peds Cross: $\bowtie$ Cars 6 Cars 0 West Peds: 1 Trucks 1 Trucks 0 0 1 South Peds: 2 0 West Entering: 410 Cyclists 0 Cyclists 0 0 South Entering: 4 West Leg Total: 789 Totals 7 Totals 0 South Leg Total: 11 **Comments**

#### Silvercreek Pkwy N @ Paisley Rd **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:15:00 17:15:00 To: 18:00:00 To: Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000001 Paisley Rd & Silvercreek Pkwy N Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley Rd runs W/E North Leg Total: 800 Cyclists 0 2 2 Cyclists 3 East Leg Total: 1012 8 Trucks 5 East Entering: North Entering: 425 3 Trucks 11 496 East Peds: North Peds: Cars 222 2 191 415 Cars 361 3 $\mathbb{X}$ Peds Cross: Totals 227 Totals 375 Peds Cross: $\bowtie$ 196 Silvercreek Pkwy N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 8 570 580 2 144 352 347 2 0 0 0 Paisley Rd 485 Cyclists Trucks Cars Totals Paisley Rd 7 222 230 1 314 319 Trucks Cyclists Totals 0 0 3 3 Cars 3 539 506 516 Silvercreek Pkwy N $\mathbb{X}$ Peds Cross: 3 Peds Cross: $\bowtie$ Cars 5 Cars 1 0 West Peds: 3 Trucks 0 Trucks 0 0 0 South Peds: 5 0 West Entering: 552 Cyclists 0 South Entering: 3 Cyclists 0 0 West Leg Total: 1132 Totals 1 South Leg Total: 8 Totals 5 **Comments**

# Silvercreek Pkwy N @ Paisley Rd

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000001

Paisley Rd & Silvercreek Pkwy N Intersection:

TFR File #:

North Leg Total: 5016

North Entering: 2452

North Peds:

Peds Cross:

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

## \*\* Signalized Intersection \*\*

154

 $\bowtie$ 

Cyclists 6 23 30 40 Trucks 25 15

17

1118

Totals 1278 18 1156

Cars 1247

Cyclists 22

Major Road: Paisley Rd runs W/E

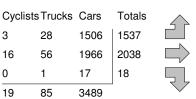
Trucks 70 Cars 2472 Totals 2564

East Leg Total: 6386 East Entering: 3179 East Peds: 46  $\mathbb{Z}$ Peds Cross:

Cyclists Trucks Cars Totals 62 3357 3443



Paisley Rd

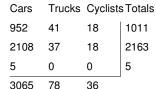




2382

Silvercreek Pkwy N





Cars

3096

Paisley Rd

Trucks Cyclists Totals

3207

71

 $\mathbb{X}$ Peds Cross: West Peds: 44 West Entering: 3593

West Leg Total: 7036

Cars 39 Trucks 1 Cyclists 1 Totals 41



Silvercreek Pkwy N

Cars 2 12 28 Trucks 0 0 1 2 Cyclists 0 1 Totals 2

Peds Cross:  $\bowtie$ South Peds: 57 South Entering: 31

South Leg Total: 72

### **Comments**

### Silvercreek Pkwy S @ Waterloo Ave **Specified Period One Hour Peak Morning Peak Diagram** From: 8:00:00 **From:** 7:00:00 9:30:00 To: To: 9:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000002 Intersection: Waterloo Ave & Silvercreek Pkwy S Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E East Leg Total: 382 East Entering: 179 East Peds: 0 $\mathbb{X}$ Peds Cross: Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 15 16 10 10 0 169 162 Silvercreek Pkwy S 172 Cyclists Trucks Cars Totals Waterloo Ave 9 10 Trucks Cyclists Totals 0 1 Cars 0 195 203 Waterloo Ave $\mathbb{X}$ Peds Cross: Cars 171 Peds Cross: $\bowtie$ Cars 5 187 192 West Peds: 0 Trucks 7 Trucks 1 9 South Peds: 6 8 West Entering: 18 Cyclists 0 0 0 South Entering: 201 Cyclists 1 West Leg Total: 34 Totals 179 Totals 6 195 South Leg Total: 380 **Comments**

### Silvercreek Pkwy S @ Waterloo Ave **Specified Period One Hour Peak** Mid-day Peak Diagram From: 12:30:00 From: 11:00:00 To: 13:30:00 To: 13:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000002 Intersection: Waterloo Ave & Silvercreek Pkwy S Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E East Leg Total: 235 East Entering: 129 East Peds: 0 $\mathbb{X}$ Peds Cross: Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 21 21 0 11 118 109 Silvercreek Pkwy S 120 Cyclists Trucks Cars Totals Waterloo Ave 11 0 15 15 Trucks Cyclists Totals 0 Cars 98 106 Waterloo Ave $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 124 Cars 10 99 4 West Peds: 0 Trucks 6 Trucks 0 4 South Peds: 0 2 West Entering: 26 Cyclists 3 Cyclists 0 2 South Entering: 105 West Leg Total: 47 Totals 10 South Leg Total: 238 Totals 133 **Comments**

### Silvercreek Pkwy S @ Waterloo Ave **Specified Period One Hour Peak Afternoon Peak Diagram** From: 15:30:00 From: 15:00:00 To: 18:00:00 To: 16:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000002 Intersection: Waterloo Ave & Silvercreek Pkwy S Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E East Leg Total: 438 East Entering: 220 East Peds: 0 $\mathbb{X}$ Peds Cross: Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 24 24 13 0 13 205 207 Silvercreek Pkwy S 218 Cyclists Trucks Cars Totals Waterloo Ave 10 0 8 Trucks Cyclists Totals 0 Cars 0 214 218 Waterloo Ave $\mathbb{X}$ Peds Cross: Cars 213 Peds Cross: $\bowtie$ Cars 11 204 215 West Peds: 0 Trucks 2 Trucks 0 3 3 South Peds: 9 0 West Entering: 19 Cyclists 0 Cyclists 0 0 South Entering: 218 West Leg Total: 43 Totals 215 Totals 11 South Leg Total: 433 **Comments**

# Silvercreek Pkwy S @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

**Site #:** 0000000002

Intersection: Waterloo Ave & Silvercreek Pkwy S

TFR File #: 2

Count date: 14-Sep-2021

Weather conditions:

Cloudy/Dry

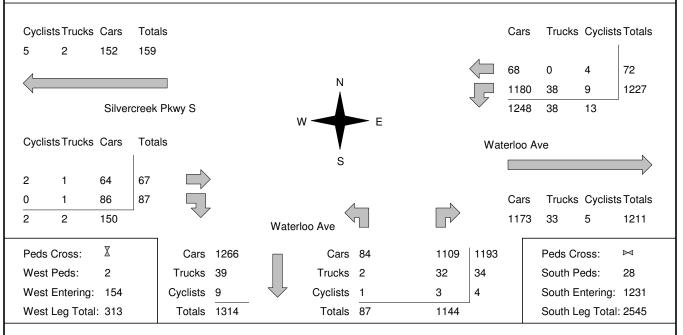
Person(s) who counted:

Cam

\*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E

East Leg Total: 2510
East Entering: 1299
East Peds: 0
Peds Cross: 

X



### **Comments**

#### Wellington St W @ Waterloo Ave **Morning Peak Diagram Specified Period One Hour Peak** From: 7:00:00 **From:** 7:45:00 To: 9:30:00 To: 8:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000003 Wellington St W & Waterloo Ave Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St W runs W/E North Leg Total: 374 Cyclists 1 0 Cyclists 0 East Leg Total: 1621 7 North Entering: 169 Trucks 7 0 Trucks 8 East Entering: 683 East Peds: North Peds: 0 Cars 159 0 2 161 Cars 197 0 $\mathbb{X}$ Peds Cross: Totals 167 2 Totals 205 Peds Cross: $\bowtie$ Waterloo Ave Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 54 920 975 0 0 650 678 28 0 0 0 0 Wellington St W 655 0 Cyclists Trucks Cars Totals Wellington St W 8 151 159 1 46 674 721 0 0 Trucks Cyclists Totals 0 0 Cars 825 884 938 Hwy 6 NB Off Ramp $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 0 Cars 111 208 360 West Peds: 0 Trucks 0 Trucks 19 7 26 South Peds: 0 West Entering: 880 0 Cyclists 0 Cyclists 0 0 South Entering: 386 West Leg Total: 1855 Totals 130 215 South Leg Total: 386 Totals 0 **Comments**

#### Wellington St W @ Waterloo Ave Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 12:30:00 To: 13:30:00 To: 13:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000003 Wellington St W & Waterloo Ave Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St W runs W/E North Leg Total: 238 Cyclists 3 0 3 Cyclists 2 East Leg Total: 1117 5 East Entering: North Entering: 131 Trucks 5 0 Trucks 4 583 East Peds: North Peds: 3 Cars 121 0 2 123 Cars 101 0 $\mathbb{X}$ Peds Cross: Totals 129 2 Totals 107 Peds Cross: $\bowtie$ Waterloo Ave Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 55 786 844 0 0 575 539 36 0 0 0 0 Wellington St W 547 0 36 Cyclists Trucks Cars Totals Wellington St W 2 4 64 70 1 24 414 439 0 0 Trucks Cyclists Totals 0 0 Cars 28 478 500 33 534 Hwy 6 NB Off Ramp $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 0 Cars 126 84 239 West Peds: 0 Trucks 0 Trucks 14 9 23 South Peds: 0 0 West Entering: 509 0 Cyclists 0 Cyclists 0 0 South Entering: 262 West Leg Total: 1353 Totals 140 South Leg Total: 262 Totals 0 **Comments**

#### Wellington St W @ Waterloo Ave **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:15:00 To: 18:00:00 To: 17:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000003 Wellington St W & Waterloo Ave Intersection: Person(s) who counted: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Wellington St W runs W/E North Leg Total: 422 Cyclists 0 0 0 Cyclists 0 East Leg Total: 1817 4 North Entering: 212 East Entering: Trucks 4 0 Trucks 5 937 North Peds: East Peds: Cars 201 0 7 208 Cars 205 0 7 $\mathbb{X}$ Totals 210 Peds Cross: Totals 205 Peds Cross: $\bowtie$ Waterloo Ave Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 46 1369 1415 0 0 929 905 24 0 0 0 0 Wellington St W 913 0 Cyclists Trucks Cars Totals Wellington St W 0 3 120 123 2 14 706 722 0 0 0 Trucks Cyclists Totals 0 Cars 17 826 860 18 880 Hwy 6 NB Off Ramp $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 0 Cars 263 147 487 West Peds: 0 Trucks 0 Trucks 18 2 4 24 South Peds: 0 West Entering: 845 Cyclists 0 0 South Entering: 511 Cyclists 0 0 West Leg Total: 2260 Totals 281 151 South Leg Total: 511 Totals 0 **Comments**

# Wellington St W @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000003

Wellington St W & Waterloo Ave Intersection:

TFR File #:

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

## \*\* Signalized Intersection \*\*

Major Road: Wellington St W runs W/E

North Leg Total: 2542 North Entering: 1306 North Peds: Peds Cross:  $\bowtie$ 

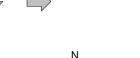
Cyclists 7 0 1 37 Trucks 36 Cars 1243 0 19 1262 Totals 1286 20

Cyclists 2 Trucks 33 Cars 1201 Totals 1236

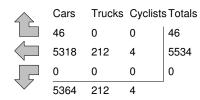
East Leg Total: 11289 East Entering: 5580 East Peds: 1  $\mathbb{X}$ Peds Cross:

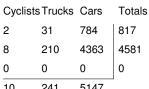
Cyclists Trucks Cars Totals 366 7843 8220





Waterloo Ave











241 5147

Hwy 6 NB Off Ramp



Trucks Cyclists Totals Cars 5432 269 5709

 $\mathbb{X}$ Peds Cross: West Peds: 0 West Entering: 5398 West Leg Total: 13618

Cars 0 Trucks 0 Cyclists 0 Totals 0

2703 Cars 1282 371 1050 Trucks 118 2 58 178 0 Cyclists 0 Totals 1400 1108

Peds Cross:  $\bowtie$ South Peds: South Entering: 2881 South Leg Total: 2881

### **Comments**

#### Yorkshire St N @ Paisley St **Morning Peak Diagram Specified Period One Hour Peak** From: 8:15:00 From: 7:00:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000009 Paisley St & Yorkshire St N Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley St runs W/E North Leg Total: 403 Cyclists 1 0 5 Cyclists 4 East Leg Total: 473 Trucks 2 3 North Entering: 189 0 Trucks 4 East Entering: 239 East Peds: North Peds: 75 Cars 73 57 51 181 Cars 206 36 $\mathbb{Z}$ Totals 76 Totals 214 Peds Cross: 62 51 Peds Cross: ⋈ Yorkshire St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 14 254 274 53 0 54 163 2 174 0 11 11 Paisley St 227 Cyclists Trucks Cars Totals Paisley St 0 52 53 2 9 133 144 0 23 24 Trucks Cyclists Totals 1 Cars 222 10 208 10 234 Yorkshire St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 91 Cars 18 101 38 157 West Peds: 218 Trucks 1 Trucks 3 1 6 South Peds: 42 7 West Entering: 221 Cyclists 5 Cyclists 3 0 South Entering: 170 West Leg Total: 495 Totals 24 South Leg Total: 267 Totals 97 **Comments**

#### Yorkshire St N @ Paisley St Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:30:00 To: 13:30:00 To: 12:30:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000009 Paisley St & Yorkshire St N Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley St runs W/E North Leg Total: 112 Cyclists 0 0 0 Cyclists 4 East Leg Total: 573 North Entering: 48 Trucks 1 0 Trucks 1 East Entering: 288 North Peds: Cars 59 East Peds: 261 Cars 25 11 11 47 49 $\mathbb{Z}$ Peds Cross: Totals 26 11 Totals 64 Peds Cross: 11 Yorkshire St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 9 273 283 23 245 252 6 1 12 0 13 Paisley St 279 2 Cyclists Trucks Cars Totals Paisley St 0 19 20 2 254 264 7 Trucks Cyclists Totals 0 0 Cars 3 280 274 285 Yorkshire St N $\mathbb{X}$ Peds Cross: 30 Peds Cross: $\bowtie$ Cars 30 Cars 3 9 West Peds: 177 Trucks 1 Trucks 2 0 0 2 South Peds: 85 West Entering: 291 Cyclists 0 4 Cyclists 0 1 South Entering: 36 West Leg Total: 574 Totals 5 South Leg Total: 67 Totals 31 **Comments**

#### Yorkshire St N @ Paisley St **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 15:00:00 To: 18:00:00 To: 16:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000009 Paisley St & Yorkshire St N Person(s) who counted: Intersection: Cam TFR File #: Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: Paisley St runs W/E North Leg Total: 263 Cyclists 0 0 2 Cyclists 4 East Leg Total: 648 4 Trucks 5 East Entering: North Entering: 144 Trucks 1 1 310 North Peds: East Peds: 80 Cars 60 47 31 138 Cars 110 25 $\mathbb{X}$ Peds Cross: Totals 61 51 32 Totals 119 Peds Cross: $\bowtie$ Yorkshire St N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 11 335 347 0 27 262 1 271 1 12 11 Paisley St 300 2 Cyclists Trucks Cars Totals Paisley St 0 38 39 3 14 274 291 2 0 22 24 Trucks Cyclists Totals Cars 17 14 334 318 338 Yorkshire St N $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 80 Cars 13 13 71 West Peds: 115 Trucks 2 Trucks 2 2 9 South Peds: 22 5 West Entering: 354 Cyclists 5 Cyclists 0 3 South Entering: 83 0 West Leg Total: 701 Totals 15 South Leg Total: 170 Totals 87 **Comments**

# Yorkshire St N @ Paisley St

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000009

Intersection: Paisley St & Yorkshire St N

TFR File #:

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

## \*\* Signalized Intersection \*\*

North Leg Total: 1396 North Entering: 686

North Peds: 530 Peds Cross:  $\bowtie$ 

Cyclists 3 18 2 23 2 21 Trucks 7 12 Cars 270 244 128 642

Cyclists 22 Trucks 19

Major Road: Paisley St runs W/E

Cars 669 Totals 710

East Leg Total: 4292 East Entering: 2069

East Peds: 172  $\mathbb{Z}$ Peds Cross:

Cyclists Trucks Cars Totals 20 72 2069 2161





Totals 280



274

132





Cars	Trucks	Cyclist	s Totals
167	6	2	175
1741	53	14	1808
83	2	1	86

61

Paisley St

Cyclists	Trucks		
1	3	214 1847 110	218
21	84	1847	1952
3	3	110	116
25	90	2171	





Paisley St

1991



17

 $\mathbb{X}$ Peds Cross: West Peds: 639 West Entering: 2286 West Leg Total: 4447

Cars 437 Trucks 17 Cyclists 22 Totals 476



Yorkshire St N

Cars 58 288 133 479 Trucks 12 10 5 27 Cyclists 3 23 19 Totals 73

Trucks Cyclists Totals Cars 2108 2223

> Peds Cross:  $\bowtie$ South Peds: 224 South Entering: 529 South Leg Total: 1005

### **Comments**

#### Yorkshire St S @ Waterloo Ave **Morning Peak Diagram Specified Period One Hour Peak** From: 8:00:00 **From:** 7:00:00 To: 9:30:00 To: 9:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000010 Intersection: Waterloo Ave & Yorkshire St S Person(s) who counted: Cam TFR File #: 10 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 1 12 North Leg Total: 261 2 Cyclists 11 East Leg Total: 494 East Entering: North Entering: 135 Trucks 1 0 Trucks 6 189 East Peds: North Peds: 24 Cars 81 5 36 122 Cars 109 4 $\mathbb{X}$ Totals 126 Peds Cross: Totals 83 38 Peds Cross: ⋈ 14 Yorkshire St S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 8 232 241 2 21 149 0 156 7 5 12 Waterloo Ave 172 Cyclists Trucks Cars Totals Waterloo Ave 2 77 80 1 11 235 247 0 2 2 Trucks Cyclists Totals 0 Cars 13 314 290 305 Yorkshire St S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 14 Cars 2 19 37 West Peds: 58 Trucks 0 Trucks 0 0 1 South Peds: 7 1 West Entering: 329 Cyclists 0 9 South Entering: 47 Cyclists 14 1 West Leg Total: 570 Totals 2 South Leg Total: 75 Totals 28 **Comments**

#### Yorkshire St S @ Waterloo Ave Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 12:00:00 To: 13:30:00 To: 13:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000010 Intersection: Waterloo Ave & Yorkshire St S Person(s) who counted: Cam TFR File #: 10 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 100 0 Cyclists 3 East Leg Total: 392 North Entering: 57 Trucks 2 1 3 East Entering: Trucks 0 194 North Peds: Cars 40 East Peds: Cars 18 9 26 53 1 $\mathbb{X}$ Peds Cross: Totals 20 10 27 Totals 43 Peds Cross: ⋈ Yorkshire St S Trucks Cyclists Totals Cyclists Trucks Cars Totals Cars 8 184 199 0 19 174 162 5 7 0 1 Waterloo Ave 181 8 Cyclists Trucks Cars Totals Waterloo Ave 2 0 13 15 2 7 156 165 0 4 Trucks Cyclists Totals 0 Cars 3 4 173 186 198 Yorkshire St S $\mathbb{X}$ Peds Cross: 17 Peds Cross: $\bowtie$ Cars 14 Cars 4 2 West Peds: 9 Trucks 0 Trucks 1 0 1 South Peds: 14 West Entering: 184 1 Cyclists 1 Cyclists 0 1 South Entering: 20 West Leg Total: 383 Totals 5 South Leg Total: 35 Totals 15 **Comments**

#### Yorkshire St S @ Waterloo Ave **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 From: 15:00:00 To: 18:00:00 To: 16:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000010 Intersection: Waterloo Ave & Yorkshire St S Person(s) who counted: Cam TFR File #: 10 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Waterloo Ave runs W/E Cyclists 0 North Leg Total: 166 1 2 Cyclists 4 East Leg Total: 505 Trucks 2 3 East Entering: North Entering: 98 1 Trucks 4 258 East Peds: North Peds: Cars 60 22 Cars 55 11 27 93 0 $\mathbb{X}$ Peds Cross: Totals 57 12 29 Totals 68 Peds Cross: ⋈ Yorkshire St S Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 10 284 296 1 13 224 8 2 234 0 11 11 Waterloo Ave 246 3 Cyclists Trucks Cars Totals Waterloo Ave 34 35 1 1 5 192 198 6 Trucks Cyclists Totals 0 0 6 Cars 232 236 5 247 Yorkshire St S $\mathbb{X}$ Peds Cross: 37 Peds Cross: $\bowtie$ Cars 28 Cars 5 17 West Peds: 58 Trucks 0 Trucks 0 2 0 2 South Peds: 19 West Entering: 239 Cyclists 0 3 6 Cyclists 1 3 South Entering: 45 West Leg Total: 535 Totals 5 South Leg Total: 74 Totals 29 **Comments**

## Yorkshire St S @ Waterloo Ave

## **Total Count Diagram**

Municipality: Guelph

**Site #:** 0000000010

Intersection: Waterloo Ave & Yorkshire St S

**TFR File #:** 10

Count date: 14-Sep-2021

Weather conditions:

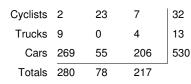
Cloudy/Dry

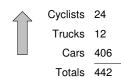
Person(s) who counted:

Cam

## \*\* Non-Signalized Intersection \*\*

Major Road: Waterloo Ave runs W/E



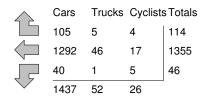


Cyclists Trucks Cars Totals 20 57 1584 1661





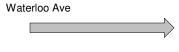
Yorkshire St S



Waterloo Ave

Cyclists	Trucks	Cars	Totals
3	4	214	221
15	45	1317	1377
2	0	33	35
20	49	1564	





50

Cars 1594

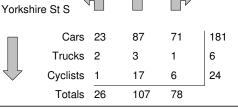
Peds Cross: 

West Peds: 176

West Entering: 1633

West Leg Total: 3294





Peds Cross: 
South Peds: 85

South Entering: 211

South Leg Total: 370

Trucks Cyclists Totals

1672

### **Comments**



**APPENDIX D** 

**SYNCHRO REPORTS** (STUDY AREA A)

## 1: Paisley St & Silvercreek Pkwy

	•	-	•	<b>†</b>	1	<b>↓</b>	4
Lane Group	EBL	EBT	WBT	NBT	SBL	SBT	SBR
Lane Configurations	*	ĵ»	4	4		र्स	7
Traffic Volume (vph)	197	337	293	1	171	1	131
Future Volume (vph)	197	337	293	1	171	1	131
Lane Group Flow (vph)	214	367	473	1	0	187	142
Turn Type	pm+pt	NA	NA	NA	Perm	NA	Perm
Protected Phases	5	2	6	4		8	
Permitted Phases	2				8		8
Detector Phase	5	2	6	4	8	8	8
Switch Phase							
Minimum Initial (s)	6.0	10.0	10.0	7.0	7.0	7.0	7.0
Minimum Split (s)	9.0	31.0	31.0	28.0	28.0	28.0	28.0
Total Split (s)	11.0	46.0	35.0	31.0	31.0	31.0	31.0
Total Split (%)	14.3%	59.7%	45.5%	40.3%	40.3%	40.3%	40.3%
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0	0.0
Total Lost Time (s)	3.0	6.0	6.0	6.0		6.0	6.0
Lead/Lag	Lead		Lag				
Lead-Lag Optimize?							
Recall Mode	None	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.53	0.40	0.71	0.00		0.44	0.24
Control Delay	13.6	12.8	25.6	18.0		24.6	4.9
Queue Delay	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	13.6	12.8	25.6	18.0		24.6	4.9
Queue Length 50th (m)	14.4	30.3	52.8	0.1		21.2	0.0
Queue Length 95th (m)	25.2	48.7	86.2	1.1		39.1	11.1
Internal Link Dist (m)		220.7	464.5	75.7		165.4	
Turn Bay Length (m)							
Base Capacity (vph)	408	921	668	610		421	585
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	0.52	0.40	0.71	0.00		0.44	0.24

### Intersection Summary

Cycle Length: 77

Actuated Cycle Length: 77

Offset: 22 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Splits and Phases: 1: Paisley St & Silvercreek Pkwy



	۶	<b>→</b>	*	•	<b>←</b>	•	1	<b>†</b>	~	1	Ţ	√
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	1			4			4			र्स	7
Traffic Volume (vph)	197	337	1	0	293	143	0	1	0	171	1	131
Future Volume (vph)	197	337	1	0	293	143	0	1	0	171	1	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0			6.0	6.0
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			0.98			1.00			1.00	0.98
Flpb, ped/bikes	1.00	1.00			1.00			1.00			0.97	1.00
Frt	1.00	1.00			0.96			1.00			1.00	0.85
FIt Protected	0.95	1.00			1.00			1.00			0.95	1.00
Satd. Flow (prot)	1729	1772			1706			1879			1700	1508
FIt Permitted	0.28	1.00			1.00			1.00			0.73	1.00
Satd. Flow (perm)	505	1772			1706			1879			1298	1508
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)	214	366	1	0	318	155	0	1	0	186	1	142
RTOR Reduction (vph)	0	0	0	0	23	0	0	0	0	0	0	96
Lane Group Flow (vph)	214	367	0	0	450	0	0	1	0	0	187	46
Confl. Peds. (#/hr)	18		5	5		18	6		18	18		6
Heavy Vehicles (%)	3%	6%	0%	0%	2%	7%	0%	0%	0%	2%	0%	4%
Turn Type	pm+pt	NA			NA			NA		Perm	NA	Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6			4			8		8
Actuated Green, G (s)	40.0	40.0			29.2			25.0			25.0	25.0
Effective Green, g (s)	40.0	40.0			29.2			25.0			25.0	25.0
Actuated g/C Ratio	0.52	0.52			0.38			0.32			0.32	0.32
Clearance Time (s)	3.0	6.0			6.0			6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	386	920			646			610			421	489
v/s Ratio Prot	c0.06	0.21			c0.26			0.00				
v/s Ratio Perm	0.23										c0.14	0.03
v/c Ratio	0.55	0.40			0.70			0.00			0.44	0.09
Uniform Delay, d1	11.8	11.2			20.2			17.6			20.5	18.1
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	1.7	1.3			6.1			0.0			3.4	0.4
Delay (s)	13.6	12.5			26.3			17.6			23.9	18.5
Level of Service	В	В			С			В			С	В
Approach Delay (s)		12.9			26.3			17.6			21.6	
Approach LOS		В			С			В			С	
Intersection Summary												
HCM 2000 Control Delay			19.5	H	CM 2000	Level of S	Service		В			
HCM 2000 Volume to Cap	acity ratio		0.58									
Actuated Cycle Length (s)			77.0	Sı	um of lost	time (s)			15.0			
Intersection Capacity Utiliz	zation		78.9%	IC	U Level o	of Service			D			
Analysis Period (min)			15									
o Critical Lana Croup												

c Critical Lane Group

	-	*	1	<b>←</b>	1	-	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	<b>↑</b>	7	*	<b>↑</b>	*	7	
Traffic Volume (veh/h)	10	4	230	6	5	242	
Future Volume (Veh/h)	10	4	230	6	5	242	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	11	4	250	7	5	263	
Pedestrians				1	7		
Lane Width (m)				3.5	3.5		
Walking Speed (m/s)				1.1	1.1		
Percent Blockage				0	1		
Right turn flare (veh)						7	
Median type	None			None			
Median storage veh)							
Upstream signal (m)							
pX, platoon unblocked							
vC, conflicting volume			22		525	19	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			22		525	19	
tC, single (s)			4.1		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
p0 queue free %			84		99	75	
cM capacity (veh/h)			1584		432	1049	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1		
Volume Total	11	4	250	7	268		
Volume Left	0	0	250	0	5		
Volume Right	0	4	0	0	263		
cSH	1700	1700	1584	1700	1069		
Volume to Capacity	0.01	0.00	0.16	0.00	0.25		
Queue Length 95th (m)	0.0	0.0	4.3	0.0	7.6		
Control Delay (s)	0.0	0.0	7.7	0.0	9.6		
Lane LOS	0.0	0.0	A	0.0	A		
Approach Delay (s)	0.0		7.5		9.6		
Approach LOS	0.0		7.0		Α		
•					,,		
Intersection Summary							
Average Delay			8.4				
Intersection Capacity Utiliza	ation		29.7%	IC	U Level c	f Service	
Analysis Period (min)			15				

## Queues

## 3: Hanlon Pkwy/Waterloo Ave & Wellington St

	۶	<b>→</b>	+	1	<b>†</b>	-	-	1	
Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	7	<b>^</b>	ተተጉ	7	4	7	1	7	
Traffic Volume (vph)	155	847	727	183	82	220	1	237	
Future Volume (vph)	155	847	727	183	82	220	1	237	
Lane Group Flow (vph)	168	921	798	141	147	239	1	258	
Turn Type	Prot	NA	NA	Perm	NA	Perm	Perm	Perm	
Protected Phases	5	2	6		8				
Permitted Phases				8		8	4	4	
Detector Phase	5	2	6	8	8	8	4	4	
Switch Phase									
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	12.1	34.1	34.1	34.5	34.5	34.5	34.5	34.5	
Total Split (s)	23.0	80.1	57.1	42.5	42.5	42.5	42.5	42.5	
Total Split (%)	18.8%	65.3%	46.6%	34.7%	34.7%	34.7%	34.7%	34.7%	
Yellow Time (s)	3.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	0.0	2.1	2.1	3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	7.1	7.1	7.5	7.5	7.5	7.5	7.5	
Lead/Lag	Lead		Lag						
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	
v/c Ratio	0.70	0.25	0.28	0.62	0.61	0.70	0.01	0.59	
Control Delay	65.3	5.8	14.9	60.6	59.5	30.8	41.0	10.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	65.3	5.8	14.9	60.6	59.5	30.8	41.0	10.8	
Queue Length 50th (m)	39.1	22.4	33.7	34.2	35.5	22.2	0.2	0.0	
Queue Length 95th (m)	59.3	35.8	54.4	52.3	54.0	46.4	1.8	21.6	
Internal Link Dist (m)		151.8	266.9		229.3				
Turn Bay Length (m)	110.0					160.0			
Base Capacity (vph)	288	3651	2836	461	487	552	303	631	
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	0.58	0.25	0.28	0.31	0.30	0.43	0.00	0.41	

### Intersection Summary

Cycle Length: 122.6

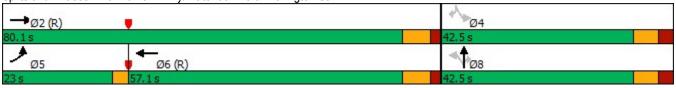
Actuated Cycle Length: 122.6

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

Natural Cycle: 85

Control Type: Actuated-Coordinated

Splits and Phases: 3: Hanlon Pkwy/Waterloo Ave & Wellington St



	۶	<b>→</b>	*	•	+	4	1	<b>†</b>	1	1	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ተተተ			ተተጉ		7	र्स	7	7		7
Traffic Volume (vph)	155	847	0	0	727	7	183	82	220	1	0	237
Future Volume (vph)	155	847	0	0	727	7	183	82	220	1	0	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.5
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	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
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.98	1.00	0.95		1.00
Satd. Flow (prot)	1716	4932			4927		1615	1706	1581	1785		1566
Flt Permitted	0.95	1.00			1.00		0.95	0.98	1.00	0.57		1.00
Satd. Flow (perm)	1716	4932			4927		1615	1706	1581	1064		1566
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)	168	921	0	0	790	8	199	89	239	1	0	258
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	121	0	0	222
Lane Group Flow (vph)	168	921	0	0	798	0	141	147	118	1	0	36
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	4%	4%	0%	0%	4%	0%	5%	1%	1%	0%	0%	2%
Turn Type	Prot	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases							8		8	4		4
Actuated Green, G (s)	17.1	90.8			70.7		17.2	17.2	17.2	17.2		17.2
Effective Green, g (s)	17.1	90.8			70.7		17.2	17.2	17.2	17.2		17.2
Actuated g/C Ratio	0.14	0.74			0.58		0.14	0.14	0.14	0.14		0.14
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	239	3652			2841		226	239	221	149		219
v/s Ratio Prot	c0.10	0.19			c0.16							
v/s Ratio Perm							c0.09	0.09	0.07	0.00		0.02
v/c Ratio	0.70	0.25			0.28		0.62	0.62	0.53	0.01		0.17
Uniform Delay, d1	50.3	5.1			13.1		49.7	49.6	49.0	45.3		46.4
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	9.0	0.2			0.2		5.3	4.6	2.5	0.0		0.4
Delay (s)	59.3	5.2			13.4		54.9	54.2	51.4	45.4		46.7
Level of Service	Е	A			В		D	D	D	D	40 =	D
Approach Delay (s)		13.6			13.4			53.1			46.7	
Approach LOS		В			В			D			D	
Intersection Summary												
HCM 2000 Control Delay			24.5	Н	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capac	city ratio		0.41	_					4= 0			
Actuated Cycle Length (s)			122.6		um of lost				17.6			
Intersection Capacity Utilizat	tion		58.1%	IC	CU Level o	ot Service			В			
Analysis Period (min)			15									

c Critical Lane Group

	۶	<b>→</b>	•	<b>←</b>	1	<b>†</b>	/	ļ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		4		4		4		4	
Traffic Volume (vph)	10	427	8	336	44	32	13	25	
Future Volume (vph)	10	427	8	336	44	32	13	25	
Lane Group Flow (vph)	0	525	0	384	0	95	0	64	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		
Detector Phase	2	2	6	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	
Total Split (s)	46.0	46.0	46.0	46.0	39.0	39.0	39.0	39.0	
Total Split (%)	54.1%	54.1%	54.1%	54.1%	45.9%	45.9%	45.9%	45.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0		6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	
v/c Ratio		0.39		0.28		0.55		0.31	
Control Delay		5.8		3.4		42.0		26.5	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		5.8		3.4		42.0		26.5	
Queue Length 50th (m)		26.4		13.2		13.1		6.1	
Queue Length 95th (m)		53.9		m21.4		26.0		16.1	
Internal Link Dist (m)		166.8		190.3		154.6		120.9	
Turn Bay Length (m)						4.0.0			
Base Capacity (vph)		1331		1355		489		556	
Starvation Cap Reductn		0		0		0		0	
Spillback Cap Reductn		0		0		0		0	
Storage Cap Reductn		0		0		0		0	
Reduced v/c Ratio		0.39		0.28		0.19		0.12	

### Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 85

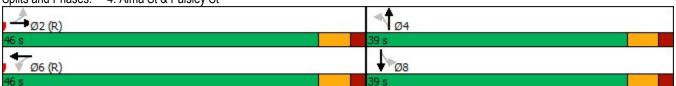
Offset: 52 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Alma St & Paisley St



	۶	-	•	•	-	•	4	<b>†</b>	~	-	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (vph)	10	427	46	8	336	9	44	32	11	13	25	21
Future Volume (vph)	10	427	46	8	336	9	44	32	11	13	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.98			0.89	
Flpb, ped/bikes		1.00			1.00			0.87			0.98	
Frt		0.99			1.00			0.98			0.95	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1737			1773			1504			1498	
FIt Permitted		0.99			0.99			0.81			0.92	
Satd. Flow (perm)		1724			1755			1245			1399	
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)	11	464	50	9	365	10	48	35	12	14	27	23
RTOR Reduction (vph)	0	2	0	0	1	0	0	9	0	0	20	0
Lane Group Flow (vph)	0	523	0	0	383	0	0	86	0	0	44	0
Confl. Peds. (#/hr)	54		91	91		54	118		50	50		118
Confl. Bikes (#/hr)									1			1
Heavy Vehicles (%)	0%	5%	7%	0%	5%	11%	5%	0%	0%	15%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		63.2			63.2			9.8			9.8	
Effective Green, g (s)		63.2			63.2			9.8			9.8	
Actuated g/C Ratio		0.74			0.74			0.12			0.12	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1281			1304			143			161	,
v/s Ratio Prot												
v/s Ratio Perm		c0.30			0.22			c0.07			0.03	
v/c Ratio		0.41			0.29			0.60			0.27	
Uniform Delay, d1		4.0			3.6			35.7			34.3	
Progression Factor		1.00			0.67			1.00			1.00	
Incremental Delay, d2		1.0			0.5			7.0			0.9	
Delay (s)		5.0			2.9			42.7			35.3	
Level of Service		Α			Α			D			D	
Approach Delay (s)		5.0			2.9			42.7			35.3	
Approach LOS		Α			Α			D			D	
Intersection Summary												
HCM 2000 Control Delay			9.4	H	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	ratio		0.43									
Actuated Cycle Length (s)			85.0		um of lost				12.0			
Intersection Capacity Utilization	1		55.5%	IC	U Level o	of Service			В			
Analysis Period (min)			15									
c Critical Lane Group												

	•	<b>→</b>	+	4	-	4
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	1→		W	
Traffic Volume (veh/h)	10	186	141	12	38	8
Future Volume (Veh/h)	10	186	141	12	38	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	202	153	13	41	9
Pedestrians		2			7	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			376			
pX, platoon unblocked						
vC, conflicting volume	173				390	168
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	173				390	168
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	99
cM capacity (veh/h)	1407				609	874
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	213	166	50			
Volume Left	11	0	41			
Volume Right	0	13	9			
cSH	1407	1700	644			
Volume to Capacity	0.01	0.10	0.08			
Queue Length 95th (m)	0.2	0.0	1.9			
Control Delay (s)	0.5	0.0	11.1			
Lane LOS	A		В			
Approach Delay (s)	0.5	0.0	11.1			
Approach LOS			В			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utiliz	ration		28.6%	IC	U Level c	f Service
Analysis Period (min)			15	10	C	. 55, 1100
Analysis i Gilou (IIIII)			10			

	•	-	1	•	1	<b>†</b>	1	<b>↓</b>	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	7	f)	7	f)	Y	f)	7	f)	
Traffic Volume (vph)	72	280	56	222	72	485	62	425	
Future Volume (vph)	72	280	56	222	72	485	62	425	
Lane Group Flow (vph)	78	370	61	303	78	588	67	520	
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	pm+pt	NA	
Protected Phases	3	8	7	4	5	2	1	6	
Permitted Phases	8		4		2		6		
Detector Phase	3	8	7	4	5	2	1	6	
Switch Phase									
Minimum Initial (s)	6.0	10.0	6.0	10.0	6.0	10.0	6.0	10.0	
Minimum Split (s)	9.0	32.0	9.0	32.0	9.0	31.0	9.0	31.0	
Total Split (s)	9.0	31.0	9.0	31.0	9.0	36.0	9.0	36.0	
Total Split (%)	10.6%	36.5%	10.6%	36.5%	10.6%	42.4%	10.6%	42.4%	
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	3.0	4.0	
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	6.0	3.0	6.0	3.0	6.0	3.0	6.0	
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag	
Lead-Lag Optimize?									
Recall Mode	None	Max	None	Max	None	C-Max	None	C-Max	
v/c Ratio	0.20	0.67	0.17	0.54	0.29	0.85	0.30	0.76	
Control Delay	19.1	35.7	15.4	27.8	14.4	38.7	15.2	32.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.1	35.7	15.4	27.8	14.4	38.7	15.2	32.6	
Queue Length 50th (m)	9.3	59.9	5.6	39.5	6.4	88.0	5.5	74.0	
Queue Length 95th (m)	19.6	88.4	12.6	64.5	13.5	#149.0	12.0	#124.2	
Internal Link Dist (m)		151.6		131.0		167.6		146.1	
Turn Bay Length (m)	35.0		110.0		65.0				
Base Capacity (vph)	391	556	350	563	271	694	220	684	
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	0.20	0.67	0.17	0.54	0.29	0.85	0.30	0.76	

Cycle Length: 85

Actuated Cycle Length: 85

Offset: 63 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

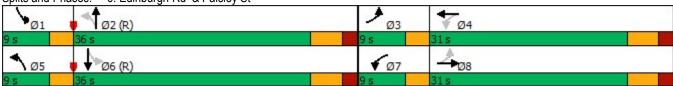
Natural Cycle: 85

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.





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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	7>		*	1→		*	1→		*	7.	
Traffic Volume (vph)	72	280	61	56	222	57	72	485	56	62	425	53
Future Volume (vph)	72	280	61	56	222	57	72	485	56	62	425	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1713	1737		1779	1755		1666	1843		1668	1818	
Flt Permitted	0.45	1.00		0.36	1.00		0.22	1.00		0.15	1.00	
Satd. Flow (perm)	814	1737		671	1755		392	1843		259	1818	
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)	78	304	66	61	241	62	78	527	61	67	462	58
RTOR Reduction (vph)	0	9	0	0	10	0	0	5	0	0	5	0
Lane Group Flow (vph)	78	361	0	61	293	0	78	583	0	67	515	0
Confl. Peds. (#/hr)	29		12	12		29	13		8	8		13
Confl. Bikes (#/hr)			1						1			1
Heavy Vehicles (%)	3%	4%	7%	0%	3%	0%	7%	0%	0%	7%	1%	2%
Parking (#/hr)	0,0	.,0	. , ,	• • • • • • • • • • • • • • • • • • • •	0,0	0	. , ,	0,0	• 70	. , ,	.,,	_,,
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4	7		2			6	U	
Actuated Green, G (s)	31.6	26.8		31.6	26.8		35.4	30.6		35.4	30.6	
Effective Green, g (s)	31.6	26.8		31.6	26.8		35.4	30.6		35.4	30.6	
Actuated g/C Ratio	0.37	0.32		0.37	0.32		0.42	0.36		0.42	0.36	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	353	547		312	553		235	663		187	654	
v/s Ratio Prot	c0.01	c0.21		0.01	0.17		0.02	c0.32		c0.02	0.28	
v/s Ratio Perm	0.07	60.21		0.06	0.17		0.02	60.02		0.13	0.20	
v/c Ratio	0.07	0.66		0.20	0.53		0.12	0.88		0.13	0.79	
Uniform Delay, d1	17.8	25.2		17.9	23.9		16.9	25.5		17.8	24.3	
Progression Factor	1.24	1.15		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	5.8		0.3	3.6		0.8	15.4		1.00	9.3	
Delay (s)	22.3	34.8		18.2	27.5		17.7	40.9		18.9	33.6	
Level of Service	22.3 C	04.0 C		10.2 B	27.5 C		В	40.9 D		10.9 B	33.0 C	
Approach Delay (s)	C	32.6		Ь	26.0		Ь	38.1		Ь	31.9	
Approach LOS		32.0 C			20.0 C			30.1 D			31.9 C	
Intersection Summary			20.0		0110000		<u> </u>					
HCM 2000 Control Delay			33.0	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capa	acity ratio		0.71						40.0			
Actuated Cycle Length (s)			85.0		um of lost				18.0			
Intersection Capacity Utiliz	ation		77.3%	IC	CU Level of	of Service	)		D			
Analysis Period (min)			15									
c Critical Lane Group												

	۶	<b>→</b>	1	<b>←</b>	4	<b>†</b>	-	ļ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	7	13	7	1€	7	13	7	13	
Traffic Volume (vph)	50	220	76	118	19	537	41	458	
Future Volume (vph)	50	220	76	118	19	537	41	458	
Lane Group Flow (vph)	54	285	83	153	21	682	45	534	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		8		4		2		6	
Permitted Phases	8		4		2		6		
Detector Phase	8	8	4	4	2	2	6	6	
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	36.0	36.0	36.0	36.0	
Total Split (s)	33.0	33.0	33.0	33.0	57.0	57.0	57.0	57.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	63.3%	63.3%	63.3%	63.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
v/c Ratio	0.22	0.73	0.58	0.39	0.04	0.58	0.12	0.45	
Control Delay	28.9	42.4	47.0	29.6	13.4	22.4	8.6	10.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.9	42.4	47.0	29.6	13.4	22.4	8.6	10.2	
Queue Length 50th (m)	7.7	44.5	13.0	21.1	0.9	71.0	2.6	39.8	
Queue Length 95th (m)	15.7	63.8	25.5	34.1	m6.4	132.1	8.8	77.2	
Internal Link Dist (m)		153.0		103.9		90.1		136.0	
Turn Bay Length (m)	20.0		25.0		50.0		40.0		
Base Capacity (vph)	349	534	197	536	494	1174	374	1187	
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	0.15	0.53	0.42	0.29	0.04	0.58	0.12	0.45	

Cycle Length: 90

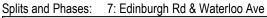
Actuated Cycle Length: 90

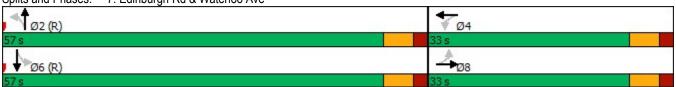
Offset: 9 (10%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.





	۶	<b>→</b>	*	•	<b>←</b>	•	4	1	~	/	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	×	1		Y	₽		Y	ĵ.		7	ĵ.	
Traffic Volume (vph)	50	220	42	76	118	23	19	537	90	41	458	33
Future Volume (vph)	50	220	42	76	118	23	19	537	90	41	458	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1726	1756		1708	1763		1773	1798		1742	1821	
Flt Permitted	0.64	1.00		0.37	1.00		0.41	1.00		0.31	1.00	
Satd. Flow (perm)	1165	1756		660	1763		760	1798		576	1821	
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)	54	239	46	83	128	25	21	584	98	45	498	36
RTOR Reduction (vph)	0	9	0	0	9	0	0	5	0	0	2	0
Lane Group Flow (vph)	54	276	0	83	144	0	21	677	0	45	532	0
Confl. Peds. (#/hr)	8		12	12		8	11		10	10		11
Confl. Bikes (#/hr)												1
Heavy Vehicles (%)	2%	3%	7%	3%	4%	0%	0%	2%	0%	2%	2%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2	_		6	•	
Actuated Green, G (s)	19.5	19.5		19.5	19.5		58.5	58.5		58.5	58.5	
Effective Green, g (s)	19.5	19.5		19.5	19.5		58.5	58.5		58.5	58.5	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	252	380		143	381		494	1168		374	1183	
v/s Ratio Prot	202	c0.16		1-10	0.08		707	c0.38		014	0.29	
v/s Ratio Perm	0.05	00.10		0.13	0.00		0.03	00.00		0.08	0.20	
v/c Ratio	0.21	0.73		0.58	0.38		0.04	0.58		0.12	0.45	
Uniform Delay, d1	29.0	32.8		31.6	30.1		5.7	8.8		6.0	7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.75	2.00		1.00	1.00	
Incremental Delay, d2	0.4	6.8		5.9	0.6		0.2	2.00		0.7	1.2	
Delay (s)	29.4	39.6		37.5	30.7		10.1	19.7		6.6	9.0	
Level of Service	23.4 C	D		D	C		В	В		Α	3.0 A	
Approach Delay (s)		38.0		U	33.1			19.4			8.8	
Approach LOS		D			C			В			Α	
Intersection Summary												
HCM 2000 Control Delay			21.3	H	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capa	city ratio		0.62									
Actuated Cycle Length (s)	-,		90.0	Sı	um of lost	time (s)			12.0			
Intersection Capacity Utiliza	ition		70.3%			of Service			C			
Analysis Period (min)			15			2.7.00						
c Critical Lane Group												

	•	<b>→</b>	•	•	•	•	1	<b>†</b>	-	-	ļ	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>^</b>	7	7	<b>^</b>	7	7	<b>^</b>	7	7	<b>^</b>	7
Traffic Volume (vph)	93	603	116	103	464	37	182	412	167	43	408	43
Future Volume (vph)	93	603	116	103	464	37	182	412	167	43	408	43
Lane Group Flow (vph)	101	655	126	112	504	40	198	448	182	47	443	47
Turn Type	pm+pt	NA	Perm									
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		6
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	10.0
Minimum Split (s)	9.0	23.0	23.0	9.0	23.0	23.0	9.0	23.0	23.0	9.0	23.0	23.0
Total Split (s)	9.0	34.0	34.0	9.0	34.0	34.0	10.0	37.0	37.0	10.0	37.0	37.0
Total Split (%)	10.0%	37.8%	37.8%	10.0%	37.8%	37.8%	11.1%	41.1%	41.1%	11.1%	41.1%	41.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.22	0.50	0.20	0.30	0.41	0.06	0.59	0.47	0.35	0.16	0.66	0.12
Control Delay	11.9	23.6	5.1	13.0	21.8	0.2	28.1	29.2	6.3	13.0	32.0	1.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.9	23.6	5.1	13.0	21.8	0.2	28.1	29.2	6.3	13.0	32.0	1.5
Queue Length 50th (m)	8.4	47.2	0.0	9.4	34.4	0.0	22.4	34.5	0.0	3.1	39.0	0.3
Queue Length 95th (m)	16.7	69.3	11.7	18.3	51.7	0.0	#38.1	47.8	14.6	m5.9	45.5	m1.6
Internal Link Dist (m)		271.8			207.6			124.8			75.7	
Turn Bay Length (m)	45.0		40.0	45.0		60.0	35.0		40.0	40.0		20.0
Base Capacity (vph)	462	1302	638	374	1242	676	334	1173	605	304	1128	567
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.50	0.20	0.30	0.41	0.06	0.59	0.38	0.30	0.15	0.39	0.08

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 84 (93%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green

Natural Cycle: 65

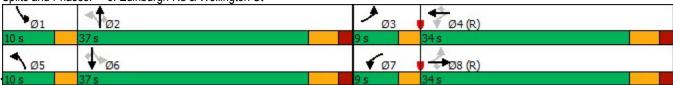
Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Edinburgh Rd & Wellington St



exam - Study Area A.syn

11/10/2021

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>	7	*	<b>^</b>	7	7	<b>^</b>	7	*	<b>^</b>	7
Traffic Volume (vph)	93	603	116	103	464	37	182	412	167	43	408	43
Future Volume (vph)	93	603	116	103	464	37	182	412	167	43	408	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
FIt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1635	3216	1392	1552	3025	1490	1649	3400	1408	1494	3275	1436
FIt Permitted	0.43	1.00	1.00	0.32	1.00	1.00	0.33	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	735	3216	1392	516	3025	1490	575	3400	1408	775	3275	1436
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)	101	655	126	112	504	40	198	448	182	47	443	47
RTOR Reduction (vph)	0	0	77	0	0	24	0	0	131	0	0	37
Lane Group Flow (vph)	101	655	49	112	504	16	198	448	51	47	443	10
Confl. Peds. (#/hr)	5		2	2		5	12		10	10		12
Confl. Bikes (#/hr)						1			3			7
Heavy Vehicles (%)	9%	11%	13%	15%	18%	5%	8%	5%	10%	19%	9%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		6
Actuated Green, G (s)	41.8	34.7	34.7	42.8	35.2	35.2	32.7	25.2	25.2	24.1	19.6	19.6
Effective Green, g (s)	41.8	34.7	34.7	42.8	35.2	35.2	32.7	25.2	25.2	24.1	19.6	19.6
Actuated g/C Ratio	0.46	0.39	0.39	0.48	0.39	0.39	0.36	0.28	0.28	0.27	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	412	1239	536	332	1183	582	329	952	394	243	713	312
v/s Ratio Prot	0.02	c0.20		c0.03	0.17		c0.07	0.13		0.01	0.14	
v/s Ratio Perm	0.09		0.03	0.13		0.01	c0.15		0.04	0.04		0.01
v/c Ratio	0.25	0.53	0.09	0.34	0.43	0.03	0.60	0.47	0.13	0.19	0.62	0.03
Uniform Delay, d1	13.8	21.3	17.6	13.7	20.0	16.9	21.1	26.9	24.2	24.9	31.8	27.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.85	1.00
Incremental Delay, d2	0.3	1.6	0.3	0.6	1.1	0.1	3.1	0.4	0.1	0.4	1.5	0.0
Delay (s)	14.1	23.0	17.9	14.3	21.1	16.9	24.2	27.2	24.4	18.0	28.5	27.8
Level of Service	В	С	В	В	С	В	С	С	С	В	С	С
Approach Delay (s)		21.2			19.7			25.9			27.5	
Approach LOS		С			В			С			С	
Intersection Summary												
HCM 2000 Control Delay			23.4	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capa	acity ratio		0.56									
Actuated Cycle Length (s)			90.0		um of los				18.0			
Intersection Capacity Utiliza	ation		61.4%	IC	U Level	of Service	•		В			
Analysis Period (min)			15									
c Critical Lane Group												

	•	<b>→</b>	•	<b>←</b>	4	<b>†</b>	<b>\</b>	ļ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		4		4		4		4	
Traffic Volume (vph)	53	144	11	199	24	107	51	62	
Future Volume (vph)	53	144	11	199	24	107	51	62	
Lane Group Flow (vph)	0	241	0	287	0	184	0	205	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		
Detector Phase	2	2	6	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	18.0	18.0	18.0	18.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	
Total Split (s)	50.0	50.0	50.0	50.0	25.0	25.0	25.0	25.0	
Total Split (%)	66.7%	66.7%	66.7%	66.7%	33.3%	33.3%	33.3%	33.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0		6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	
v/c Ratio		0.23		0.25		0.59		0.76	
Control Delay		6.5		6.2		31.9		40.4	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		6.5		6.2		31.9		40.4	
Queue Length 50th (m)		11.5		13.1		21.2		21.5	
Queue Length 95th (m)		24.8		27.8		37.1		40.5	
Internal Link Dist (m)		237.5		168.5		115.4		103.8	
Turn Bay Length (m)									
Base Capacity (vph)		1042		1141		417		349	
Starvation Cap Reductn		0		0		0		0	
Spillback Cap Reductn		0		0		0		0	
Storage Cap Reductn		0		0		0		0	
Reduced v/c Ratio		0.23		0.25		0.44		0.59	
latana atian O									

Cycle Length: 75

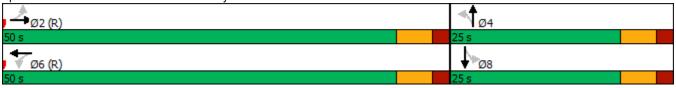
Actuated Cycle Length: 75

Offset: 43 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 9: Yorkshire St & Paisley St



	۶	<b>→</b>	•	•	<b>—</b>	•	4	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (vph)	53	144	24	11	199	54	24	107	39	51	62	76
Future Volume (vph)	53	144	24	11	199	54	24	107	39	51	62	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.99			0.98			0.98			0.89	
Flpb, ped/bikes		0.99			1.00			0.98			0.99	
Frt		0.99			0.97			0.97			0.95	
Flt Protected		0.99			1.00			0.99			0.99	
Satd. Flow (prot)		1797			1751			1724			1521	
Flt Permitted		0.87			0.99			0.92			0.81	
Satd. Flow (perm)		1588			1731			1593			1251	
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)	58	157	26	12	216	59	26	116	42	55	67	83
RTOR Reduction (vph)	0	5	0	0	10	0	0	15	0	0	36	0
Lane Group Flow (vph)	0	236	0	0	277	0	0	169	0	0	169	0
Confl. Peds. (#/hr)	49		34	34		49	125		23	23		125
Confl. Bikes (#/hr)			1			1						4
Heavy Vehicles (%)	0%	0%	1%	0%	3%	0%	0%	0%	4%	0%	0%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		49.0			49.0			14.0			14.0	
Effective Green, g (s)		49.0			49.0			14.0			14.0	
Actuated g/C Ratio		0.65			0.65			0.19			0.19	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1037			1130			297			233	
v/s Ratio Prot												
v/s Ratio Perm		0.15			c0.16			0.11			c0.14	
v/c Ratio		0.23			0.24			0.57			0.73	
Uniform Delay, d1		5.3			5.4			27.7			28.7	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.5			0.5			2.5			10.7	
Delay (s)		5.8			5.9			30.2			39.4	
Level of Service		A			A			С			D	
Approach Delay (s) Approach LOS		5.8 A			5.9 A			30.2 C			39.4 D	
Intersection Summary												
HCM 2000 Control Delay			18.2	Н	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	y ratio		0.35									
Actuated Cycle Length (s)			75.0	S	um of lost	time (s)			12.0			
Intersection Capacity Utilizatio	n		64.2%			of Service	!		С			
Analysis Period (min)			15									
c Critical Lane Group												

	•	<b>→</b>	*	<b>√</b>	+	4	•	<b>†</b>	<i>&gt;</i>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	80	247	2	12	156	21	2	25	20	38	14	83
Future Volume (vph)	80	247	2	12	156	21	2	25	20	38	14	83
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)	87	268	2	13	170	23	2	27	22	41	15	90
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	357	206	51	146								
Volume Left (vph)	87	13	2	41								
Volume Right (vph)	2	23	22	90								
Hadj (s)	0.11	0.03	-0.21	-0.30								
Departure Headway (s)	4.8	4.9	5.3	5.0								
Degree Utilization, x	0.48	0.28	0.08	0.20								
Capacity (veh/h)	717	692	583	638								
Control Delay (s)	12.1	9.8	8.7	9.3								
Approach Delay (s)	12.1	9.8	8.7	9.3								
Approach LOS	В	Α	Α	Α								
Intersection Summary												
Delay			10.7									
Level of Service			В									
Intersection Capacity Utiliza	tion		56.9%	IC	U Level o	of Service			В			
Analysis Period (min)			15									

	٠	<b>→</b>	•	•	<b>←</b>	4	1	<b>†</b>	<i>&gt;</i>	<b>/</b>	ļ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (veh/h)	8	227	6	7	205	9	9	31	24	12	37	13
Future Volume (Veh/h)	8	227	6	7	205	9	9	31	24	12	37	13
Sign Control		Free			Free			Stop			Stop	
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	247	7	8	223	10	10	34	26	13	40	14
Pedestrians		9			2			25			24	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			0			2			2	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		193			390							
pX, platoon unblocked												
vC, conflicting volume	257			279			580	566	278	582	565	261
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	257			279			580	566	278	582	565	261
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.4
p0 queue free %	99			99			97	92	97	96	90	98
cM capacity (veh/h)	1292			1267			362	409	748	362	413	743
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	263	241	70	67								
Volume Left	9	8	10	13								
Volume Right	7	10	26	14								
cSH	1292	1267	481	442								
Volume to Capacity	0.01	0.01	0.15	0.15								
Queue Length 95th (m)	0.2	0.1	3.8	4.0								
Control Delay (s)	0.3	0.3	13.8	14.6								
Lane LOS	Α	Α	В	В								
Approach Delay (s)	0.3	0.3	13.8	14.6								
Approach LOS			В	В								
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utiliza	ition		29.8%	IC	CU Level o	of Service			Α			
Analysis Period (min)			15									

	۶	<b>→</b>	•	•	<b>←</b>	•	•	<b>†</b>	<b>/</b>	<b>/</b>	ļ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			- ↔			4	
Traffic Volume (veh/h)	50	248	8	17	131	24	7	19	3	26	9	39
Future Volume (Veh/h)	50	248	8	17	131	24	7	19	3	26	9	39
Sign Control		Free			Free			Stop			Stop	
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)	54	270	9	18	142	26	8	21	3	28	10	42
Pedestrians		3			2			14			3	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			1			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					401							
pX, platoon unblocked												
vC, conflicting volume	171			293			638	604	290	592	595	161
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	171			293			638	604	290	592	595	161
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.2	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.6	4.0	3.4
p0 queue free %	96			99			98	95	100	92	97	95
cM capacity (veh/h)	1384			1264			342	388	743	372	392	866
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	333	186	32	80								
Volume Left	54	18	8	28								
Volume Right	9	26	3	42								
cSH	1384	1264	392	536								
Volume to Capacity	0.04	0.01	0.08	0.15								
Queue Length 95th (m)	0.9	0.3	2.0	4.0								
Control Delay (s)	1.6	0.9	15.0	12.9								
Lane LOS	Α	Α	В	В								
Approach Delay (s)	1.6	0.9	15.0	12.9								
Approach LOS			В	В								
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utiliza	tion		39.9%	IC	U Level o	of Service			Α			
Analysis Period (min)			15									

	<b>⊸</b>	<b>→</b>	*	•	•	•	1	<b>†</b>	-	ļ	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	A	<b>↑</b>	7	*	<b>↑</b>	Z.	*	1	To a	7	
Traffic Volume (vph)	70	122	110	37	63	22	87	216	23	438	
Future Volume (vph)	70	122	110	37	63	22	87	216	23	438	
Lane Group Flow (vph)	76	133	120	40	68	24	95	330	25	508	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	
Protected Phases		8		7	4		5	2	1	6	
Permitted Phases	8		8	4		4	2		6		
Detector Phase	8	8	8	7	4	4	5	2	1	6	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	6.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	9.0	29.0	29.0	9.0	31.0	9.0	31.0	
Total Split (s)	29.0	29.0	29.0	10.0	39.0	39.0	10.0	41.0	10.0	41.0	
Total Split (%)	32.2%	32.2%	32.2%	11.1%	43.3%	43.3%	11.1%	45.6%	11.1%	45.6%	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	3.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	None	Max	Max	None	C-Max	None	C-Max	
v/c Ratio	0.22	0.31	0.29	0.10	0.12	0.05	0.34	0.50	0.06	0.83	
Control Delay	28.1	28.5	7.3	17.4	19.7	19.0	19.5	27.1	10.4	38.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.1	28.5	7.3	17.4	19.7	19.0	19.5	27.1	10.4	38.0	
Queue Length 50th (m)	10.5	18.8	0.0	4.2	7.7	2.6	10.5	41.0	1.9	79.1	
Queue Length 95th (m)	22.3	34.9	12.8	10.3	16.5	7.8	m19.3	71.8	5.5	#137.1	
Internal Link Dist (m)		162.2			100.7			126.2		147.3	
Turn Bay Length (m)	30.0		20.0	35.0		35.0			25.0		
Base Capacity (vph)	339	433	417	405	558	458	282	659	447	615	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.22	0.31	0.29	0.10	0.12	0.05	0.34	0.50	0.06	0.83	

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 84 (93%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

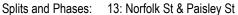
Natural Cycle: 80

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.





exam - Study Area A.syn 11/10/2021 Synchro 10 Report Page 21

	_#	<b>→</b>	•	•	•	•	4	<b>†</b>	7	-	ļ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	N	<b>^</b>	7	7	<b>†</b>	Z.	×	T <sub>2</sub>		1	ĵ.	
Traffic Volume (vph)	70	122	110	37	63	22	87	216	87	23	438	29
Future Volume (vph)	70	122	110	37	63	22	87	216	87	23	438	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.84	1.00	1.00	0.91	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.94	1.00	1.00	0.93	1.00	1.00	1.00	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1506	1445	1113	1457	1523	1250	1481	1444		1448	1492	
Flt Permitted	0.71	1.00	1.00	0.60	1.00	1.00	0.25	1.00		0.52	1.00	
Satd. Flow (perm)	1130	1445	1113	928	1523	1250	383	1444		789	1492	
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)	76	133	120	40	68	24	95	235	95	25	476	32
RTOR Reduction (vph)	0	0	84	0	0	0	0	0	0	0	2	0
Lane Group Flow (vph)	76	133	36	40	68	24	95	330	0	25	506	0
Confl. Peds. (#/hr)	35		74	74		35	35		33	33		35
Confl. Bikes (#/hr)			2									12
Heavy Vehicles (%)	0%	17%	8%	3%	11%	5%	8%	13%	1%	9%	11%	21%
Parking (#/hr)												
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	27.0	27.0	27.0	34.2	34.2	34.2	43.7	38.1		37.9	35.2	
Effective Green, g (s)	27.0	27.0	27.0	34.2	34.2	34.2	43.7	38.1		37.9	35.2	
Actuated g/C Ratio	0.30	0.30	0.30	0.38	0.38	0.38	0.49	0.42		0.42	0.39	
Clearance Time (s)	6.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	339	433	333	377	578	475	254	611		352	583	
v/s Ratio Prot		c0.09		0.00	c0.04		c0.02	0.23		0.00	c0.34	
v/s Ratio Perm	0.07		0.03	0.04		0.02	0.16			0.03		
v/c Ratio	0.22	0.31	0.11	0.11	0.12	0.05	0.37	0.54		0.07	0.87	
Uniform Delay, d1	23.6	24.3	22.8	17.8	18.1	17.6	14.9	19.4		15.4	25.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.55	1.29		1.00	1.00	
Incremental Delay, d2	1.5	1.8	0.7	0.1	0.4	0.2	0.8	2.9		0.1	15.9	
Delay (s)	25.2	26.1	23.4	18.0	18.5	17.8	24.0	27.9		15.5	41.2	
Level of Service	С	С	С	В	В	В	С	С		В	D	
Approach Delay (s)		24.9			18.2			27.0			40.0	
Approach LOS		С			В			С			D	
Intersection Summary												
HCM 2000 Control Delay			30.6	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capa	city ratio		0.58									
Actuated Cycle Length (s)	,		90.0	S	um of los	t time (s)			18.0			
Intersection Capacity Utiliza	tion		78.9%		U Level		)		D			
Analysis Period (min)			15									
c Critical Lane Group												

	۶	-	7	•	+	•	1	1	~	-	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			413		7	13	
Traffic Volume (veh/h)	5	10	28	13	6	37	29	536	46	57	678	27
Future Volume (Veh/h)	5	10	28	13	6	37	29	536	46	57	678	27
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	11	30	14	7	40	32	583	50	62	737	29
Pedestrians		37			35			9			9	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		3			3			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								294			150	
pX, platoon unblocked	0.73	0.73	0.73	0.73	0.73		0.73					
vC, conflicting volume	1320	1644	798	1612	1634	360	803			668		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1253	1699	532	1655	1685	360	540			668		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	93	81	91	55	88	94	96			93		
cM capacity (veh/h)	68	56	346	31	58	617	729			903		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total						766						
	46	61	324	342	62							
Volume Left	5	14	32	0	62	0						
Volume Right	30	40	0	50	0	29						
cSH	129	96	729	1700	903	1700						
Volume to Capacity	0.36	0.63	0.04	0.20	0.07	0.45						
Queue Length 95th (m)	11.0	23.3	1.0	0.0	1.7	0.0						
Control Delay (s)	47.4	92.2	1.5	0.0	9.3	0.0						
Lane LOS	E	F	Α		A							
Approach Delay (s)	47.4	92.2	0.7		0.7							
Approach LOS	Е	F										
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilizat	tion		68.0%	IC	U Level o	of Service			С			
Analysis Period (min)			15									

	•	*	1	<b>†</b>	<b>↓</b>	
Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations	7	7	*	<b>†</b>	<b>†</b>	
Traffic Volume (vph)	214	154	83	459	613	
Future Volume (vph)	214	154	83	459	613	
Lane Group Flow (vph)	233	167	90	499	802	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	4
Permitted Phases	8	8	2			
Minimum Split (s)	31.0	31.0	9.0	34.0	34.0	23.5
Total Split (s)	32.0	32.0	10.0	58.0	48.0	32.0
Total Split (%)	35.6%	35.6%	11.1%	64.4%	53.3%	36%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	3.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
v/c Ratio	0.64	0.35	0.27	0.54	0.57	
Control Delay	37.3	6.4	7.0	14.3	14.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.3	6.4	7.0	14.3	14.5	
Queue Length 50th (m)	35.1	0.0	7.5	67.2	29.1	
Queue Length 95th (m)	60.1	13.9	m7.9	m84.9	m45.9	
Internal Link Dist (m)				178.2	178.4	
Turn Bay Length (m)	30.0	100.0				
Base Capacity (vph)	364	479	339	930	1409	
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	0.64	0.35	0.27	0.54	0.57	

Cycle Length: 90

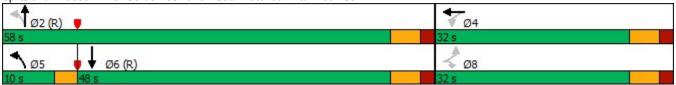
Actuated Cycle Length: 90

Offset: 10 (11%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75 Control Type: Pretimed

m Volume for 95th percentile queue is metered by upstream signal.





	۶	<b>→</b>	*	•	<b>←</b>	•	4	†	~	1	<b>†</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7		7		4		7	<b>^</b>			<b>†</b>	
Traffic Volume (vph)	214	0	154	0	0	0	83	459	0	0	613	125
Future Volume (vph)	214	0	154	0	0	0	83	459	0	0	613	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0				3.0	6.0			6.0	
Lane Util. Factor	1.00		1.00				1.00	1.00			0.95	
Frpb, ped/bikes	1.00		0.90				1.00	1.00			0.98	
Flpb, ped/bikes	0.99		1.00				1.00	1.00			1.00	
Frt	1.00		0.85				1.00	1.00			0.97	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1581		1250				1538	1610			2979	
FIt Permitted	0.76		1.00				0.26	1.00			1.00	
Satd. Flow (perm)	1260		1250				418	1610			2979	
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)	233	0	167	0	0	0	90	499	0	0	666	136
RTOR Reduction (vph)	0	0	119	0	0	0	0	0	0	0	19	0
Lane Group Flow (vph)	233	0	48	0	0	0	90	499	0	0	783	0
Confl. Peds. (#/hr)	2		87	87		2	44		2	2		44
Confl. Bikes (#/hr)												3
Heavy Vehicles (%)	1%	0%	3%	0%	0%	0%	4%	5%	0%	0%	4%	1%
Turn Type	Perm		Perm				pm+pt	NA			NA	
Protected Phases					4		5	2			6	
Permitted Phases	8		8	4			2					
Actuated Green, G (s)	26.0		26.0				52.0	52.0			42.0	
Effective Green, g (s)	26.0		26.0				52.0	52.0			42.0	
Actuated g/C Ratio	0.29		0.29				0.58	0.58			0.47	
Clearance Time (s)	6.0		6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	364		361				328	930			1390	
v/s Ratio Prot							0.02	c0.31			0.26	
v/s Ratio Perm	c0.18		0.04				0.14					
v/c Ratio	0.64		0.13				0.27	0.54			0.56	
Uniform Delay, d1	27.9		23.7				9.4	11.6			17.4	
Progression Factor	1.00		1.00				0.81	1.08			0.77	
Incremental Delay, d2	8.4		8.0				1.2	1.2			1.5	
Delay (s)	36.3		24.4				8.8	13.8			14.9	
Level of Service	D		С				Α	В			В	
Approach Delay (s)		31.3			0.0			13.0			14.9	
Approach LOS		С			А			В			В	
Intersection Summary												
HCM 2000 Control Delay			18.0	H	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capa	city ratio		0.59									
	ation			IC	U Level o	of Service	)		В			
,			15									
Actuated Cycle Length (s) Intersection Capacity Utiliza Analysis Period (min)	·		90.0 60.5% 15		um of lost U Level o		<b>;</b>		15.0 B			

c Critical Lane Group

16.	Wellington	St &	Gordon	St
10.	VV Chiniquon	Ot Q	GOIGOII	Οt

	۶	<b>→</b>	•	+	1	<b>†</b>	1	1	ļ
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	*	<b>†</b>	*	<b>†</b>	×	<b>^</b>	7	7	<b>↑</b> ↑
Traffic Volume (vph)	94	659	27	626	116	700	34	300	477
Future Volume (vph)	94	659	27	626	116	700	34	300	477
Lane Group Flow (vph)	102	745	29	952	126	761	37	326	596
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	5	2	1	6	7	4		3	8
Permitted Phases	2		6		4		4	8	
Detector Phase	5	2	1	6	7	4	4	3	8
Switch Phase									
Minimum Initial (s)	6.0	10.0	6.0	10.0	6.0	7.0	7.0	6.0	7.0
Minimum Split (s)	9.0	34.0	9.0	34.0	9.0	33.0	33.0	9.0	33.0
Total Split (s)	11.0	35.0	11.0	35.0	10.0	34.0	34.0	10.0	34.0
Total Split (%)	12.2%	38.9%	12.2%	38.9%	11.1%	37.8%	37.8%	11.1%	37.8%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	3.0	6.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	Max	None	Max	Max	None	Max
v/c Ratio	0.50	0.60	0.10	0.89	0.41	0.82	0.08	1.38	0.65
Control Delay	22.4	25.0	13.5	39.2	18.9	37.6	0.3	214.6	21.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	25.0	13.5	39.2	18.9	37.6	0.3	214.6	21.3
Queue Length 50th (m)	9.5	47.6	2.6	79.1	12.4	63.7	0.0	~53.2	38.7
Queue Length 95th (m)	18.7	79.9	7.0	#120.1	23.0	#88.3	0.0	#105.5	56.2
Internal Link Dist (m)		223.6		183.2		222.9			157.4
Turn Bay Length (m)	65.0		110.0		80.0		55.0	35.0	
Base Capacity (vph)	210	1237	311	1065	310	925	490	237	916
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	0.49	0.60	0.09	0.89	0.41	0.82	0.08	1.38	0.65

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 88 (98%), Referenced to phase 2:EBTL, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

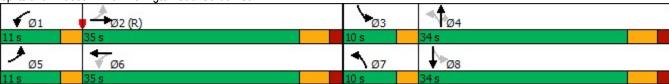
Volume exceeds capacity, queue is theoretically infinite.

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: 16: Wellington St & Gordon St



11/10/2021 Page 26

	٠	<b>→</b>	*	•	<b>←</b>	*	4	1	~	/	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>†</b> 1>		*	<b>†</b>		*	<b>^</b>	7	*	<b>†</b> 1>	
Traffic Volume (vph)	94	659	27	27	626	250	116	700	34	300	477	72
Future Volume (vph)	94	659	27	27	626	250	116	700	34	300	477	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.98	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1529	3098		1544	2935		1604	2975	1334	1544	2896	
Flt Permitted	0.12	1.00		0.29	1.00		0.32	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	199	3098		479	2935		541	2975	1334	341	2896	
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)	102	716	29	29	680	272	126	761	37	326	518	78
RTOR Reduction (vph)	0	3	0	0	46	0	0	0	25	0	13	0
Lane Group Flow (vph)	102	742	0	29	906	0	126	761	12	326	583	0
Confl. Peds. (#/hr)	28		2	2		28	16		4	4		16
Confl. Bikes (#/hr)			6			3						1
Heavy Vehicles (%)	5%	3%	4%	4%	3%	5%	0%	8%	6%	4%	9%	4%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6			4		4	8		
Actuated Green, G (s)	40.0	34.1		33.6	30.7		34.9	28.0	28.0	35.1	28.1	
Effective Green, g (s)	40.0	34.1		33.6	30.7		34.9	28.0	28.0	35.1	28.1	
Actuated g/C Ratio	0.44	0.38		0.37	0.34		0.39	0.31	0.31	0.39	0.31	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	181	1173		213	1001		291	925	415	226	904	
v/s Ratio Prot	c0.04	0.24		0.00	c0.31		0.03	0.26		c0.11	0.20	
v/s Ratio Perm	0.21	VIII.		0.05			0.13		0.01	c0.45	0.20	
v/c Ratio	0.56	0.63		0.14	0.90		0.43	0.82	0.03	1.44	0.64	
Uniform Delay, d1	17.7	22.8		18.2	28.3		18.6	28.7	21.5	24.4	26.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.24	0.69	
Incremental Delay, d2	4.0	2.6		0.3	13.1		1.0	8.2	0.1	220.1	3.2	
Delay (s)	21.6	25.4		18.5	41.4		19.7	36.9	21.7	250.3	21.5	
Level of Service	С	С		В	D		В	D	С	F	С	
Approach Delay (s)		25.0			40.7			33.9			102.4	
Approach LOS		С			D			С			F	
Intersection Summary												
HCM 2000 Control Delay			50.9	Н	CM 2000	Level of	Service		D			
HCM 2000 Volume to Capa	acity ratio		1.14									
Actuated Cycle Length (s)			90.0		um of lost				18.0			
Intersection Capacity Utiliza	ation		92.3%	IC	CU Level of	of Service	)		F			
Analysis Period (min)			15									
c Critical Lane Group												

₩ Ø6 (R)

	<b>†</b>	Ţ	
Lane Group	NBT	SBT	Ø3
Lane Configurations	<b>↑</b>	<u> </u>	
Traffic Volume (vph)	550	500	
Future Volume (vph)	550	500	
Lane Group Flow (vph)	598	543	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.37	0.34	
Control Delay	7.3	6.9	
Queue Delay	4.3	0.0	
Total Delay	11.5	6.9	
Queue Length 50th (m)	125.3	109.0	
Queue Length 95th (m)	134.4	117.7	
Internal Link Dist (m)	121.2	63.2	
Turn Bay Length (m)	1017	1017	
Base Capacity (vph)	1617	1617	
Starvation Cap Reductn	922	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0 24	
Reduced v/c Ratio	0.86	0.34	
Intersection Summary			
Cycle Length: 600			
Actuated Cycle Length: 600			
Offset: 0 (0%), Referenced	to phase 2:	NBT and (	S:SBT, St
Natural Cycle: 600			
Control Type: Pretimed			
Splits and Phases: 18: Ed	dinburgh Ro	d & Rail C	rossing
. T <sub>(72.70</sub> )			
Ø2 (R)			
P 12 3			

	_#	•	1	†	*	4	Ţ	1	4	4	
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	
Lane Configurations				<b>*</b>			*				
Traffic Volume (vph)	0	0	0	550	0	0	500	0	0	0	
Future Volume (vph)	0	0	0	550	0	0	500	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				15.0			15.0				
Lane Util. Factor				1.00			1.00				
Frt				1.00			1.00				
Flt Protected				1.00			1.00				
Satd. Flow (prot)				1842			1842				
FIt Permitted				1.00			1.00				
Satd. Flow (perm)				1842			1842				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	598	0	0	543	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	0	0	598	0	0	543	0	0	0	
Turn Type				NA			NA				
Protected Phases				2			6				
Permitted Phases											
Actuated Green, G (s)				527.0			527.0				
Effective Green, g (s)				527.0			527.0				
Actuated g/C Ratio				0.88			0.88				
Clearance Time (s)				15.0			15.0				
Lane Grp Cap (vph)				1617			1617				
v/s Ratio Prot				c0.32			0.29				
v/s Ratio Perm											
v/c Ratio				0.37			0.34				
Uniform Delay, d1				6.6			6.3				
Progression Factor				1.00			1.00				
Incremental Delay, d2				0.7			0.6				
Delay (s)				7.2			6.9				
Level of Service				Α			Α				
Approach Delay (s)	0.0			7.2			6.9		0.0		
Approach LOS	Α			Α			Α		Α		
Intersection Summary											
HCM 2000 Control Delay			7.1	H	CM 2000	Level of S	Service		Α		
HCM 2000 Volume to Capacity	ratio		0.34								
Actuated Cycle Length (s)			600.0		um of lost				27.0		
Intersection Capacity Utilization	1	4	451.7%	IC	U Level c	f Service			Н		
Analysis Period (min)			15								
c Critical Lane Group											

Ø6 (R)

# 19: Alma St & Rail Crossing

	<b>†</b>	Ţ	
Lane Group	NBT	SBT	Ø3
Lane Configurations	*	<u> </u>	
Traffic Volume (vph)	82	145	
Future Volume (vph)	82	145	
Lane Group Flow (vph)	89	158	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.06	0.10	
Control Delay	4.7	5.0	
Queue Delay	0.0	0.0	
Total Delay	4.7	5.0	
Queue Length 50th (m)	13.2	24.4	
Queue Length 95th (m)	17.2	29.6	
Internal Link Dist (m)	68.0	175.4	
Turn Bay Length (m)			
Base Capacity (vph)	1617	1617	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.06	0.10	
Intersection Summary			
Cycle Length: 600			
Actuated Cycle Length: 600			
Offset: 0 (0%), Referenced	to phase 2:	NBT and 6	S:SBT, St
Natural Cycle: 600			
Control Type: Pretimed			
Califo and Dhagon 40: Al	ma C+ 0 D-	oil Croosis	~
Splits and Phases: 19: Al	ma St & Ra	ali Crossin	9
<b>T</b> ø2 (R)			
542 s			

		3									-	
	٠	<b>→</b>	•	•	•	*	1	<b>†</b>	1	-	<b>↓</b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>^</b>			<b>^</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	82	0	0	145	0
Future Volume (vph)	0	0	0	0	0	0	0	82	0	0	145	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1842			1842	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1842			1842	
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)	0	0	0	0	0	0	0	89	0	0	158	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	89	0	0	158	0
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1617			1617	
v/s Ratio Prot								0.05			c0.09	
v/s Ratio Perm												
v/c Ratio								0.06			0.10	
Uniform Delay, d1								4.7			4.9	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								4.7			5.0	
Level of Service								Α			Α	
Approach Delay (s)		0.0			0.0			4.7			5.0	
Approach LOS		Α			Α			Α			Α	
Intersection Summary												
HCM 2000 Control Delay			4.9	Н	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	ratio		0.09									
Actuated Cycle Length (s)			600.0	S	um of lost	time (s)			27.0			
Intersection Capacity Utilization	)		451.7%	IC	U Level o	of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												

### Queues

# 20: Rail Crossing & Yorkshire St

	<b>†</b>	<b>↓</b>	
Lane Group	NBT	SBT	Ø3
Lane Configurations	<b>†</b>	<b>↑</b>	
Traffic Volume (vph)	159	157	
Future Volume (vph)	159	157	
Lane Group Flow (vph)	173	171	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.11	0.11	
Control Delay	5.0	5.0	
Queue Delay	2.8	0.0	
Total Delay	7.8	5.0	
Queue Length 50th (m)	27.0	26.7	
Queue Length 95th (m)	32.3	32.1	
Internal Link Dist (m)	45.7	70.8	
Turn Bay Length (m)			
Base Capacity (vph)	1617	1617	
Starvation Cap Reductn	1330	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.60	0.11	
Intersection Summary			
Cycle Length: 600			
Actuated Cycle Length: 600			
Offset: 0 (0%), Referenced to	o phase 2:	NBT and 6	3:SBT, Sta
Natural Cycle: 600	, <u>-</u>		- ,
Control Type: Pretimed			
Splits and Phases: 20: Ra	ail Crossing	& Yorksh	ire St
Ø2 (R)			
J123			

zo: rtail orocollig a rt												
	۶	<b>→</b>	•	•	•	*	1	<b>†</b>	1	-	<b>↓</b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>^</b>			<b>^</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	159	0	0	157	0
Future Volume (vph)	0	0	0	0	0	0	0	159	0	0	157	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1842			1842	
Flt Permitted								1.00			1.00	
Satd. Flow (perm)								1842			1842	
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)	0	0	0	0	0	0	0	173	0	0	171	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	173	0	0	171	0
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1617			1617	
v/s Ratio Prot								c0.09			0.09	
v/s Ratio Perm								60.03			0.03	
v/c Ratio								0.11			0.11	
Uniform Delay, d1								4.9			4.9	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								5.0			5.0	
Level of Service								3.0 A			3.0 A	
Approach Delay (s)		0.0			0.0			5.0			5.0	
Approach LOS		Α			Α			3.0 A			3.0 A	
• •		^						^				
Intersection Summary									_			
HCM 2000 Control Delay			5.0	H	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity r	atio		0.10									
Actuated Cycle Length (s)			600.0		um of lost				27.0			
Intersection Capacity Utilization			451.7%	IC	U Level o	of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												

	<b>†</b>	Ţ			
Lane Group	NBT	SBT	Ø3		
Lane Configurations		<b>↑</b>	~~		
Traffic Volume (vph)	78	93			
Future Volume (vph)	78	93			
Lane Group Flow (vph)	85	101			
Turn Type	NA	NA			
Protected Phases	2	6	3		
Permitted Phases	<del>-</del>	•			
Minimum Split (s)	542.0	542.0	58.0		
Total Split (s)	542.0	542.0	58.0		
Total Split (%)	90.3%	90.3%	10%		
Yellow Time (s)	10.0	10.0	10.0		
All-Red Time (s)	5.0	5.0	2.0		
Lost Time Adjust (s)	0.0	0.0			
Total Lost Time (s)	15.0	15.0			
Lead/Lag					
Lead-Lag Optimize?					
v/c Ratio	0.05	0.06			
Control Delay	4.7	4.8			
Queue Delay	0.0	0.0			
Total Delay	4.7	4.8			
Queue Length 50th (m)	12.6	15.1			
Queue Length 95th (m)	16.6	19.3			
Internal Link Dist (m)	125.5	52.5			
Turn Bay Length (m)					
Base Capacity (vph)	1617	1617			
Starvation Cap Reductn	0	0			
Spillback Cap Reductn	0	0			
Storage Cap Reductn	0	0			
Reduced v/c Ratio	0.05	0.06			
Intersection Summary					
Cycle Length: 600					
Actuated Cycle Length: 60					
Offset: 0 (0%), Referenced	to phase 2	NBT and	6:SBT, St	art of Green	
Natural Cycle: 600					
Control Type: Pretimed					
Splits and Phases: 21: 0	Blasgow St.	& Rail Cro	ssing		
•					
Ø2 (R)					
▼ Ø6 (R)					

ZII Claugew et. art		999										
	۶	<b>→</b>	•	1	•	•	1	1	1	-	<b>↓</b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>^</b>			<b>^</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	78	0	0	93	0
Future Volume (vph)	0	0	0	0	0	0	0	78	0	0	93	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1842			1842	
FIt Permitted								1.00			1.00	
Satd. Flow (perm)								1842			1842	
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)	0	0	0	0	0	0	0	85	0	0	101	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	85	0	0	101	0
Turn Type	<u> </u>							NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1617			1617	
v/s Ratio Prot								0.05			c0.05	
v/s Ratio Perm								0.00			00.00	
v/c Ratio								0.05			0.06	
Uniform Delay, d1								4.7			4.7	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								4.7			4.8	
Level of Service								A			Α	
Approach Delay (s)		0.0			0.0			4.7			4.8	
Approach LOS		A			A			Α			A	
Intersection Summary												
HCM 2000 Control Delay			4.7	Н	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	y ratio		0.06									
Actuated Cycle Length (s)			600.0	Sı	um of lost	time (s)			27.0			
Intersection Capacity Utilizatio	n		451.7%			of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												

	٠	<b>→</b>	•	4	<b>†</b>	-	ļ	4	
Lane Group	EBL	EBT	WBT	NBL	NBT	SBL	SBT	SBR	
Lane Configurations	*	f)	4		4		4	7	
Traffic Volume (vph)	274	379	392	2	0	217	0	295	
Future Volume (vph)	274	379	392	2	0	217	0	295	
Lane Group Flow (vph)	298	413	627	0	2	0	236	321	
Turn Type	pm+pt	NA	NA	Perm	NA	Perm	NA	Perm	
Protected Phases	5	2	6		4		8		
Permitted Phases	2			4		8		8	
Detector Phase	5	2	6	4	4	8	8	8	
Switch Phase									
Minimum Initial (s)	6.0	10.0	10.0	7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	9.0	31.0	31.0	28.0	28.0	28.0	28.0	28.0	
Total Split (s)	11.0	46.0	35.0	29.0	29.0	29.0	29.0	29.0	
Total Split (%)	14.7%	61.3%	46.7%	38.7%	38.7%	38.7%	38.7%	38.7%	
Yellow Time (s)	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	3.0	6.0	6.0		6.0		6.0	6.0	
Lead/Lag	Lead		Lag						
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	
v/c Ratio	0.71	0.37	0.82		0.01		0.71	0.52	
Control Delay	21.1	9.9	30.7		18.5		37.3	5.9	
Queue Delay	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	21.1	9.9	30.7		18.5		37.3	5.9	
Queue Length 50th (m)	16.3	27.6	76.4		0.2		30.2	0.0	
Queue Length 95th (m)	#59.0	51.7	#137.4		1.6		48.9	16.4	
Internal Link Dist (m)		220.7	464.5		75.7		165.4		
Turn Bay Length (m)									
Base Capacity (vph)	420	1119	761		300		430	705	
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	0.71	0.37	0.82		0.01		0.55	0.46	

Cycle Length: 75

Actuated Cycle Length: 75

Offset: 22 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

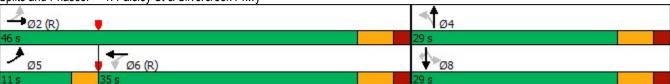
Natural Cycle: 75

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.





	٠	<b>→</b>	*	•	<b>←</b>	4	1	<b>†</b>	~	-	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	1			4			4			र्स	7
Traffic Volume (vph)	274	379	1	0	392	185	2	0	0	217	0	295
Future Volume (vph)	274	379	1	0	392	185	2	0	0	217	0	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0			6.0			6.0			6.0	6.0
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00			0.99			1.00			1.00	0.99
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	1.00			0.96			1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00			0.95			0.95	1.00
Satd. Flow (prot)	1785	1860			1772			1784			1761	1576
Flt Permitted	0.17	1.00			1.00			0.52			0.76	1.00
Satd. Flow (perm)	326	1860			1772			981			1403	1576
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)	298	412	1	0	426	201	2	0	0	236	0	321
RTOR Reduction (vph)	0	0	0	0	22	0	0	0	0	0	0	244
Lane Group Flow (vph)	298	413	0	0	605	0	0	2	0	0	236	77
Confl. Peds. (#/hr)	3	40/	2	2	00/	3	1	00/	2	2	00/	1
Heavy Vehicles (%)	0%	1%	0%	0%	0%	2%	0%	0%	0%	1%	0%	0%
Turn Type	pm+pt	NA			NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2		•	6			4		•	8	•
Permitted Phases	2	45.4		6	04.0		4	47.0		8	47.0	8
Actuated Green, G (s)	45.1	45.1			31.3			17.9			17.9	17.9
Effective Green, g (s)	45.1	45.1			31.3			17.9			17.9	17.9
Actuated g/C Ratio	0.60	0.60			0.42			0.24			0.24	0.24
Clearance Time (s)	3.0	6.0			6.0			6.0			6.0	6.0
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	3.0
Lane Grp Cap (vph)	406	1118			739			234			334	376
v/s Ratio Prot	c0.11	0.22			c0.34			0.00			0.47	0.05
v/s Ratio Perm	0.34	0.07			0.00			0.00			c0.17	0.05
v/c Ratio	0.73	0.37			0.82			0.01			0.71	0.20
Uniform Delay, d1	11.6 1.00	7.7 1.00			19.3 1.00			21.8			26.1	22.8
Progression Factor	6.7	0.9			9.8			1.00			1.00 6.7	1.00
Incremental Delay, d2	18.3	8.6			29.2			21.8			32.8	0.3 23.1
Delay (s) Level of Service	10.3 B	0.0 A			29.2 C			21.0 C			32.0 C	23.1 C
Approach Delay (s)	Б	12.7			29.2			21.8			27.2	C
Approach LOS		12.7 B			29.2 C			Z1.0			21.2 C	
•		Ь			U			C			C	
Intersection Summary												
HCM 2000 Control Delay			22.4	H	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capa	acity ratio		0.77						15.			
Actuated Cycle Length (s)			75.0		um of lost				15.0			
Intersection Capacity Utiliza	ation		79.3%	IC	U Level o	ot Service			D			
Analysis Period (min)			15									

c Critical Lane Group

	-	•	•	•	4	-
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	<b>↑</b>	7	7	<b>↑</b>	7	7
Traffic Volume (veh/h)	9	12	250	9	18	251
Future Volume (Veh/h)	9	12	250	9	18	251
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	13	272	10	20	273
Pedestrians					1	
Lane Width (m)					3.5	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						7
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			24		565	11
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			24		565	11
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					J. 1	Ţ. <u>_</u>
tF (s)			2.2		3.5	3.3
p0 queue free %			83		95	75
cM capacity (veh/h)			1589		405	1072
	ED 4	ED 0		WD 0		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	10	13	272	10	293	
Volume Left	0	0	272	0	20	
Volume Right	1700	13	1500	1700	273	
cSH	1700	1700	1589	1700	1150	
Volume to Capacity	0.01	0.01	0.17	0.01	0.25	
Queue Length 95th (m)	0.0	0.0	4.7	0.0	7.7	
Control Delay (s)	0.0	0.0	7.7	0.0	9.8	
Lane LOS			_ A		Α	
Approach Delay (s)	0.0		7.5		9.8	
Approach LOS					Α	
Intersection Summary						
Average Delay			8.3			
Intersection Capacity Utiliza	ation		30.5%	IC	U Level c	f Service
Analysis Period (min)			15			
raidijoio i oriod (iriiri)			10			

### Queues

# 3: Hanlon Pkwy/Waterloo Ave & Wellington St

	•	-	•	1	<b>†</b>	-	1	1	
Lane Group	EBL	EBT	WBT	NBL	NBT	NBR	SBL	SBR	
Lane Configurations	*	ተተተ	ተተ <sub>ጉ</sub>	7	र्स	7	*	7	
Traffic Volume (vph)	148	752	972	388	112	139	5	257	
Future Volume (vph)	148	752	972	388	112	139	5	257	
Lane Group Flow (vph)	161	817	1067	270	274	151	5	279	
Turn Type	Prot	NA	NA	Perm	NA	Perm	Perm	Perm	
Protected Phases	5	2	6		8				
Permitted Phases				8		8	4	4	
Detector Phase	5	2	6	8	8	8	4	4	
Switch Phase									
Minimum Initial (s)	7.0	20.0	20.0	10.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	12.1	34.1	34.1	34.5	34.5	34.5	34.5	34.5	
Total Split (s)	23.0	80.1	57.1	42.5	42.5	42.5	42.5	42.5	
Total Split (%)	18.8%	65.3%	46.6%	34.7%	34.7%	34.7%	34.7%	34.7%	
Yellow Time (s)	3.0	5.0	5.0	4.5	4.5	4.5	4.5	4.5	
All-Red Time (s)	0.0	2.1	2.1	3.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	3.0	7.1	7.1	7.5	7.5	7.5	7.5	7.5	
Lead/Lag	Lead		Lag						
Lead-Lag Optimize?									
Recall Mode	None	C-Max	C-Max	None	None	None	None	None	
v/c Ratio	0.70	0.24	0.41	0.75	0.74	0.33	0.04	0.50	
Control Delay	67.2	9.1	20.7	57.4	56.4	7.3	34.4	7.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	67.2	9.1	20.7	57.4	56.4	7.3	34.4	7.3	
Queue Length 50th (m)	37.5	26.6	57.1	64.3	65.0	0.0	1.0	0.0	
Queue Length 95th (m)	58.5	40.1	82.8	87.2	88.4	15.3	4.1	19.6	
Internal Link Dist (m)		151.8	266.9		229.3				
Turn Bay Length (m)	110.0					160.0			
Base Capacity (vph)	288	3383	2597	479	493	559	183	650	
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	0.56	0.24	0.41	0.56	0.56	0.27	0.03	0.43	

### Intersection Summary

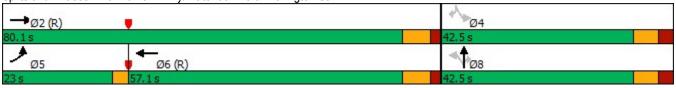
Cycle Length: 122.6
Actuated Cycle Length: 122.6

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

Natural Cycle: 85

Control Type: Actuated-Coordinated

Splits and Phases: 3: Hanlon Pkwy/Waterloo Ave & Wellington St



	٠	<b>→</b>	•	•	+	•	1	<b>†</b>	~	/	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>^</b>			ተተጉ		*	र्स	7	7		7
Traffic Volume (vph)	148	752	0	0	972	9	388	112	139	5	0	257
Future Volume (vph)	148	752	0	0	972	9	388	112	139	5	0	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.5
Lane Util. Factor	1.00	0.91			0.91		0.95	0.95	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
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Frt	1.00	1.00			1.00		1.00	1.00	0.85	1.00		0.85
Flt Protected	0.95	1.00			1.00		0.95	0.97	1.00	0.95		1.00
Satd. Flow (prot)	1767	5079			5072		1679	1727	1581	1785		1581
Flt Permitted	0.95	1.00			1.00		0.95	0.97	1.00	0.34		1.00
Satd. Flow (perm)	1767	5079			5072		1679	1727	1581	643		1581
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)	161	817	0	0	1057	10	422	122	151	5	0	279
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	119	0	0	219
Lane Group Flow (vph)	161	817	0	0	1067	0	270	274	32	5	0	60
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	1%	1%	0%	0%	1%	0%	1%	0%	1%	0%	0%	1%
Turn Type	Prot	NA			NA		Perm	NA	Perm	Perm		Perm
Protected Phases	5	2			6			8				
Permitted Phases							8		8	4		4
Actuated Green, G (s)	15.9	81.7			62.8		26.3	26.3	26.3	26.3		26.3
Effective Green, g (s)	15.9	81.7			62.8		26.3	26.3	26.3	26.3		26.3
Actuated g/C Ratio	0.13	0.67			0.51		0.21	0.21	0.21	0.21		0.21
Clearance Time (s)	3.0	7.1			7.1		7.5	7.5	7.5	7.5		7.5
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	229	3384			2598		360	370	339	137		339
v/s Ratio Prot	c0.09	0.16			c0.21							
v/s Ratio Perm							c0.16	0.16	0.02	0.01		0.04
v/c Ratio	0.70	0.24			0.41		0.75	0.74	0.10	0.04		0.18
Uniform Delay, d1	51.1	8.1			18.5		45.1	45.0	38.6	38.1		39.3
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	9.4	0.2			0.5		8.5	7.8	0.1	0.1		0.3
Delay (s)	60.5	8.3			18.9		53.6	52.7	38.7	38.2		39.6
Level of Service	Е	Α			В		D	D	D	D		D
Approach Delay (s)		16.9			18.9			50.0			39.5	
Approach LOS		В			В			D			D	
Intersection Summary												
HCM 2000 Control Delay			27.4	Н	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capa	city ratio		0.54									
Actuated Cycle Length (s)			122.6		um of lost				17.6			
Intersection Capacity Utiliza	ıtion		67.0%	IC	CU Level o	of Service			С			
Analysis Period (min)			15									

c Critical Lane Group

	۶	<b>→</b>	•	<b>←</b>	1	<b>†</b>	/	ļ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		4		4		4		4	
Traffic Volume (vph)	21	456	5	507	58	29	13	24	
Future Volume (vph)	21	456	5	507	58	29	13	24	
Lane Group Flow (vph)	0	591	0	577	0	120	0	66	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		
Detector Phase	2	2	6	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	
Total Split (s)	46.0	46.0	46.0	46.0	39.0	39.0	39.0	39.0	
Total Split (%)	54.1%	54.1%	54.1%	54.1%	45.9%	45.9%	45.9%	45.9%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0		6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	
v/c Ratio		0.43		0.41		0.57		0.28	
Control Delay		6.2		3.7		38.9		24.2	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		6.2		3.7		38.9		24.2	
Queue Length 50th (m)		31.5		19.5		15.7		5.9	
Queue Length 95th (m)		63.0		m32.8		29.9		15.9	
Internal Link Dist (m)		166.8		190.3		154.6		120.9	
Turn Bay Length (m)		100-							
Base Capacity (vph)		1367		1417		579		639	
Starvation Cap Reductn		0		0		0		0	
Spillback Cap Reductn		0		0		0		0	
Storage Cap Reductn		0		0		0		0	
Reduced v/c Ratio		0.43		0.41		0.21		0.10	

Cycle Length: 85

Actuated Cycle Length: 85

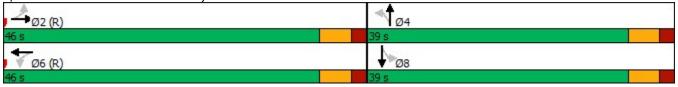
Offset: 52 (61%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Alma St & Paisley St



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (vph)	21	456	66	5	507	19	58	29	23	13	24	24
Future Volume (vph)	21	456	66	5	507	19	58	29	23	13	24	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.97			0.95	
Flt Protected		1.00			1.00			0.97			0.99	
Satd. Flow (prot)		1823			1849			1761			1737	
Flt Permitted		0.97			1.00			0.81			0.91	
Satd. Flow (perm)		1773			1843			1461			1604	
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	496	72	5	551	21	63	32	25	14	26	26
RTOR Reduction (vph)	0	3	0	0	1	0	0	16	0	0	23	0
Lane Group Flow (vph)	0	588	0	0	576	0	0	104	0	0	43	0
Confl. Peds. (#/hr)	6		4	4		6	3		3	3		3
Confl. Bikes (#/hr)									2			1
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		63.0			63.0			10.0			10.0	
Effective Green, g (s)		63.0			63.0			10.0			10.0	
Actuated g/C Ratio		0.74			0.74			0.12			0.12	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1314			1365			171			188	
v/s Ratio Prot												
v/s Ratio Perm		c0.33			0.31			c0.07			0.03	
v/c Ratio		0.45			0.42			0.61			0.23	
Uniform Delay, d1		4.3			4.1			35.6			34.0	
Progression Factor		1.00			0.60			1.00			1.00	
Incremental Delay, d2		1.1			0.7			6.0			0.6	
Delay (s)		5.4			3.2			41.7			34.6	
Level of Service		Α			Α			D			С	
Approach Delay (s)		5.4			3.2			41.7			34.6	
Approach LOS		Α			Α			D			С	
Intersection Summary												
HCM 2000 Control Delay			9.1	H	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	ratio		0.47									
Actuated Cycle Length (s)			85.0		um of lost				12.0			
Intersection Capacity Utilization			64.8%	IC	U Level of	of Service			С			
Analysis Period (min)			15									
c Critical Lane Group												

	٠	-	<b>←</b>	•	-	1
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		र्स	1→		N/	
Traffic Volume (veh/h)	21	239	230	67	26	29
Future Volume (Veh/h)	21	239	230	67	26	29
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	260	250	73	28	32
Pedestrians		10			8	
Lane Width (m)		3.5			3.5	
Walking Speed (m/s)		1.1			1.1	
Percent Blockage		1			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)			376			
pX, platoon unblocked	0.93				0.93	0.93
vC, conflicting volume	331				600	304
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	237				528	209
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				94	96
cM capacity (veh/h)	1233				464	762
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	283	323	60			
Volume Left	23	0	28			
Volume Right	0	73	32			
cSH	1233	1700	586			
Volume to Capacity	0.02	0.19	0.10			
Queue Length 95th (m)	0.4	0.0	2.6			
Control Delay (s)	0.8	0.0	11.8			
Lane LOS	A	0.0	В			
Approach Delay (s)	0.8	0.0	11.8			
Approach LOS	<u> </u>	<u> </u>	В			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utiliz	zation		43.1%	10	U Level c	of Sorvice
Analysis Period (min)	LallUII		45.1%	10	O LEVEL C	ii Sei Vice
Analysis Period (min)			10			

			1		*		•	
Lane Group EBL EBT WBL WBT NBL NBT SBL SBT		NBT	NBL	WBT	WBL	EBT	EBL	Lane Group
Lane Configurations \$\f\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	<b>,</b> ,	1	7	1	*	1	*	Lane Configurations
Traffic Volume (vph) 100 308 44 308 113 537 82 499		537	113	308		308	100	Traffic Volume (vph)
Future Volume (vph) 100 308 44 308 113 537 82 499		537		308		308	100	Future Volume (vph)
Lane Group Flow (vph) 109 422 48 395 123 617 89 620	7 89	617	123	395	48	422	109	Lane Group Flow (vph)
Turn Type pm+pt NA pm+pt NA pm+pt NA pm+pt NA			pm+pt	NA	pm+pt		pm+pt	Turn Type
Protected Phases 3 8 7 4 5 2 1 6	2 ′	2	5	4	7	8	3	Protected Phases
Permitted Phases 8 4 2 6								Permitted Phases
Detector Phase 3 8 7 4 5 2 1 6	2 ′	2	5	4	7	8	3	Detector Phase
Switch Phase								Switch Phase
Minimum Initial (s) 6.0 10.0 6.0 10.0 6.0 10.0 6.0 10.0	0 6.0	10.0	6.0	10.0	6.0	10.0	6.0	Minimum Initial (s)
Minimum Split (s) 9.0 32.0 9.0 32.0 9.0 31.0 9.0 31.0			9.0	32.0	9.0	32.0	9.0	Minimum Split (s)
Total Split (s) 9.0 31.0 9.0 36.0 9.0 36.0		36.0						Total Split (s)
Total Split (%) 10.6% 36.5% 10.6% 36.5% 10.6% 42.4% 10.6% 42.4%		42.4%	10.6%	36.5%	10.6%	36.5%		Total Split (%)
Yellow Time (s) 3.0 4.0 3.0 4.0 3.0 4.0 3.0 4.0	0 3.0	4.0	3.0	4.0	3.0	4.0	3.0	Yellow Time (s)
All-Red Time (s) 0.0 2.0 0.0 2.0 0.0 2.0 0.0 2.0	0.0	2.0	0.0	2.0	0.0	2.0	0.0	All-Red Time (s)
Lost Time Adjust (s) 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	Lost Time Adjust (s)
Total Lost Time (s) 3.0 6.0 3.0 6.0 3.0 6.0 3.0 6.0	0 3.0	6.0	3.0	6.0	3.0	6.0	3.0	Total Lost Time (s)
Lead/Lag Lead Lag Lead Lag Lead Lag	g Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lead/Lag
Lead-Lag Optimize?								Lead-Lag Optimize?
Recall Mode None Max None C-Max None C-Max	x None	C-Max	None	Max	None		None	Recall Mode
v/c Ratio 0.33 0.69 0.15 0.68 0.55 0.88 0.42 0.90								v/c Ratio
Control Delay 20.5 34.9 15.2 32.9 21.5 42.5 17.7 44.0			21.5	32.9		34.9		Control Delay
Queue Delay 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0								Queue Delay
Total Delay 20.5 34.9 15.2 32.9 21.5 42.5 17.7 44.0								•
Queue Length 50th (m) 13.0 68.5 4.4 55.9 10.3 94.8 7.3 95.4								• ,
Queue Length 95th (m) 25.1 #106.7 10.4 #89.4 19.4 #159.8 14.9 #161.4	8 14.9	#159.8	19.4	#89.4	10.4	#106.7	25.1	Queue Length 95th (m)
Internal Link Dist (m) 151.6 131.0 167.6 146.1	6	167.6		131.0		151.6		Internal Link Dist (m)
Turn Bay Length (m) 35.0 110.0 65.0								, ,
Base Capacity (vph) 329 608 326 577 224 698 214 692			224					
Starvation Cap Reductn 0 0 0 0 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						-		•
Reduced v/c Ratio 0.33 0.69 0.15 0.68 0.55 0.88 0.42 0.90	8 0.42	0.88	0.55	0.68	0.15	0.69	0.33	Reduced v/c Ratio

Cycle Length: 85

Actuated Cycle Length: 85

Offset: 63 (74%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 6: Edinburgh Rd & Paisley St



expm - Study Area A.syn 11/10/2021 Synchro 10 Report Page 9

	۶	<b>→</b>	*	•	•	•	1	<b>†</b>	~	-	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	7		*	1>		*	1>		*	1	
Traffic Volume (vph)	100	308	80	44	308	55	113	537	30	82	499	72
Future Volume (vph)	100	308	80	44	308	55	113	537	30	82	499	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1780	1777		1771	1809		1785	1861		1700	1836	
Flt Permitted	0.32	1.00		0.33	1.00		0.13	1.00		0.13	1.00	
Satd. Flow (perm)	596	1777		608	1809		250	1861		239	1836	
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)	109	335	87	48	335	60	123	584	33	89	542	78
RTOR Reduction (vph)	0	11	0	0	7	0	0	3	0	0	6	0
Lane Group Flow (vph)	109	411	0	48	388	0	123	614	0	89	614	0
Confl. Peds. (#/hr)	13		37	37		13	7		2	2		7
Confl. Bikes (#/hr)			•	<b>.</b>		2	•		_	<del>-</del>		
Heavy Vehicles (%)	0%	1%	0%	0%	1%	0%	0%	0%	0%	5%	0%	0%
Parking (#/hr)					.,.	0	- 70		0,10	0,10	- 70	
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4	<u>'</u>		2			6		
Actuated Green, G (s)	33.4	28.6		31.0	27.4		34.8	30.0		34.8	30.0	
Effective Green, g (s)	33.4	28.6		31.0	27.4		34.8	30.0		34.8	30.0	
Actuated g/C Ratio	0.39	0.34		0.36	0.32		0.41	0.35		0.41	0.35	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	597		270	583		189	656		180	648	
v/s Ratio Prot	c0.02	c0.23		0.01	0.21		c0.04	0.33		0.03	c0.33	
v/s Ratio Perm	0.12	00.20		0.06	0.21		0.23	0.00		0.03	00.00	
v/c Ratio	0.36	0.69		0.18	0.66		0.65	0.94		0.49	0.95	
Uniform Delay, d1	17.5	24.4		18.3	24.8		19.4	26.6		19.0	26.7	
Progression Factor	1.22	1.13		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.9		0.3	5.9		7.8	22.6		2.1	24.6	
Delay (s)	22.0	33.4		18.6	30.7		27.2	49.2		21.1	51.4	
Level of Service	ZZ.0	C		В	C		C C	43.2 D		C C	D D	
Approach Delay (s)	U	31.1		D	29.4		U	45.5		U	47.6	
Approach LOS		C			23.4 C			43.3 D			47.0 D	
••												
Intersection Summary			40.0		014 6000		0 :					
HCM 2000 Control Delay	,, .,		40.0	Н	CM 2000	Level of	Service		D			
HCM 2000 Volume to Capa												
Actuated Cycle Length (s)	· ,				um of lost				18.0			
Intersection Capacity Utiliz				IC	U Level o	of Service	)		D			
Analysis Period (min)			15									
c Critical Lane Group												

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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	*	1	7	1	ሻ	1	ሻ	1	
Traffic Volume (vph)	46	148	91	228	37	600	47	592	
Future Volume (vph)	46	148	91	228	37	600	47	592	
Lane Group Flow (vph)	50	207	99	295	40	739	51	678	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		8		4		2		6	
Permitted Phases	8		4		2		6		
Detector Phase	8	8	4	4	2	2	6	6	
Switch Phase									
Minimum Initial (s)	7.0	7.0	7.0	7.0	10.0	10.0	10.0	10.0	
Minimum Split (s)	27.0	27.0	27.0	27.0	36.0	36.0	36.0	36.0	
Total Split (s)	33.0	33.0	33.0	33.0	57.0	57.0	57.0	57.0	
Total Split (%)	36.7%	36.7%	36.7%	36.7%	63.3%	63.3%	63.3%	63.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
v/c Ratio	0.36	0.51	0.46	0.73	0.10	0.62	0.15	0.56	
Control Delay	35.2	32.0	36.2	41.6	7.0	19.4	9.3	12.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	
Total Delay	35.2	32.0	36.2	41.6	7.0	19.8	9.3	12.1	
Queue Length 50th (m)	7.4	29.2	15.0	46.1	1.3	127.8	3.1	57.0	
Queue Length 95th (m)	16.4	44.7	27.2	65.6	m10.9	167.3	10.0	108.6	
Internal Link Dist (m)		153.0		103.9		90.1		136.0	
Turn Bay Length (m)	20.0		25.0		50.0		40.0		
Base Capacity (vph)	191	545	294	549	382	1192	338	1205	
Starvation Cap Reductn	0	0	0	0	0	126	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	0.26	0.38	0.34	0.54	0.10	0.69	0.15	0.56	

# Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

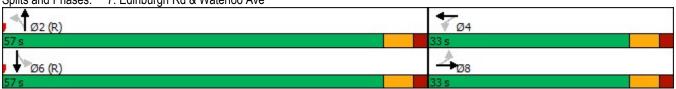
Offset: 76 (84%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 7: Edinburgh Rd & Waterloo Ave



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	₽		*	1>		7	1>		*	1>	
Traffic Volume (vph)	46	148	42	91	228	43	37	600	80	47	592	32
Future Volume (vph)	46	148	42	91	228	43	37	600	80	47	592	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1779		1766	1806		1782	1836		1779	1860	
Flt Permitted	0.35	1.00		0.53	1.00		0.32	1.00		0.28	1.00	
Satd. Flow (perm)	639	1779		982	1806		591	1836		522	1860	
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)	50	161	46	99	248	47	40	652	87	51	643	35
RTOR Reduction (vph)	0	12	0	0	9	0	0	4	0	0	2	0
Lane Group Flow (vph)	50	195	0	99	286	0	40	735	0	51	676	0
Confl. Peds. (#/hr)	10		7	7		10	4		9	9		4
Confl. Bikes (#/hr)			2			2			2			
Heavy Vehicles (%)	2%	1%	2%	0%	1%	0%	0%	0%	1%	0%	0%	2%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		8			4			2			6	
Permitted Phases	8			4	-		2	_		6		
Actuated Green, G (s)	19.7	19.7		19.7	19.7		58.3	58.3		58.3	58.3	
Effective Green, g (s)	19.7	19.7		19.7	19.7		58.3	58.3		58.3	58.3	
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.65	0.65		0.65	0.65	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	139	389		214	395		382	1189		338	1204	
v/s Ratio Prot	100	0.11		<u> </u>	c0.16		002	c0.40		000	0.36	
v/s Ratio Perm	0.08	0.11		0.10	00.10		0.07	00.10		0.10	0.00	
v/c Ratio	0.36	0.50		0.46	0.73		0.10	0.62		0.15	0.56	
Uniform Delay, d1	29.8	30.8		30.5	32.6		6.0	9.3		6.2	8.8	
Progression Factor	1.00	1.00		1.00	1.00		0.81	1.59		1.00	1.00	
Incremental Delay, d2	1.6	1.0		1.6	6.5		0.5	2.2		0.9	1.9	
Delay (s)	31.4	31.8		32.1	39.1		5.4	17.0		7.1	10.7	
Level of Service	С	C		C	D		A	В		A	В	
Approach Delay (s)		31.8			37.4		,,	16.4		, ,	10.4	
Approach LOS		C			D			В			В	
Intersection Summary												
HCM 2000 Control Delay	<u></u>		20.0	H	CM 2000	Level of S	Service		С			
HCM 2000 Volume to Capa	city ratio		0.64									
Actuated Cycle Length (s)		90.0			um of lost	time (s)			12.0			
Intersection Capacity Utiliza	tion					of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>^</b>	7	*	<b>^</b>	7	7	<b>^</b>	7	*	<b>^</b>	7
Traffic Volume (vph)	89	681	161	166	727	57	173	541	187	71	613	44
Future Volume (vph)	89	681	161	166	727	57	173	541	187	71	613	44
Lane Group Flow (vph)	97	740	175	180	790	62	188	588	203	77	666	48
Turn Type	pm+pt	NA	Perm									
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		6
Detector Phase	3	8	8	7	4	4	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	10.0
Minimum Split (s)	9.0	23.0	23.0	9.0	23.0	23.0	9.0	23.0	23.0	9.0	23.0	23.0
Total Split (s)	9.0	34.0	34.0	9.0	34.0	34.0	10.0	37.0	37.0	10.0	37.0	37.0
Total Split (%)	10.0%	37.8%	37.8%	10.0%	37.8%	37.8%	11.1%	41.1%	41.1%	11.1%	41.1%	41.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	None	C-Min	C-Min	None	C-Min	C-Min	None	None	None	None	None	None
v/c Ratio	0.33	0.69	0.29	0.58	0.67	0.10	0.68	0.57	0.35	0.24	0.73	0.11
Control Delay	16.4	30.6	6.1	24.5	28.8	1.5	30.6	28.5	5.1	16.9	34.7	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.4	30.6	6.1	24.5	28.8	1.5	30.6	28.5	5.1	16.9	34.7	4.0
Queue Length 50th (m)	8.3	59.3	1.3	16.2	61.1	0.0	20.6	46.7	0.0	9.2	55.7	0.0
Queue Length 95th (m)	18.7	80.5	15.2	#41.7	87.6	2.5	#34.6	57.5	13.7	m16.4	70.3	m2.7
Internal Link Dist (m)		271.8			207.6			124.8			75.7	
Turn Bay Length (m)	45.0		40.0	45.0		60.0	35.0		40.0	40.0		20.0
Base Capacity (vph)	295	1072	595	311	1180	614	276	1149	624	330	1138	532
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.69	0.29	0.58	0.67	0.10	0.68	0.51	0.33	0.23	0.59	0.09

# Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 1 (1%), Referenced to phase 4:WBTL and 8:EBTL, Start of Green

Natural Cycle: 65

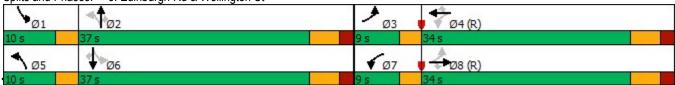
Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Edinburgh Rd & Wellington St



expm - Study Area A.syn 11/10/2021 Synchro 10 Report Page 13

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>^</b>	7	*	<b>^</b>	7	7	<b>^</b>	7	*	<b>^</b>	7
Traffic Volume (vph)	89	681	161	166	727	57	173	541	187	71	613	44
Future Volume (vph)	89	681	161	166	727	57	173	541	187	71	613	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
FIt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3187	1445	1668	3159	1462	1667	3336	1427	1712	3305	1339
FIt Permitted	0.25	1.00	1.00	0.22	1.00	1.00	0.23	1.00	1.00	0.36	1.00	1.00
Satd. Flow (perm)	437	3187	1445	380	3159	1462	395	3336	1427	641	3305	1339
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)	97	740	175	180	790	62	188	588	203	77	666	48
RTOR Reduction (vph)	0	0	110	0	0	40	0	0	140	0	0	34
Lane Group Flow (vph)	97	740	65	180	790	22	188	588	63	77	666	14
Confl. Peds. (#/hr)	5		1	1		5	10		12	12		10
Confl. Bikes (#/hr)						1			6			
Heavy Vehicles (%)	8%	12%	9%	7%	13%	7%	7%	7%	8%	4%	8%	16%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		6
Actuated Green, G (s)	35.7	29.6	29.6	41.3	32.4	32.4	36.0	27.9	27.9	31.0	25.4	25.4
Effective Green, g (s)	35.7	29.6	29.6	41.3	32.4	32.4	36.0	27.9	27.9	31.0	25.4	25.4
Actuated g/C Ratio	0.40	0.33	0.33	0.46	0.36	0.36	0.40	0.31	0.31	0.34	0.28	0.28
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	255	1048	475	301	1137	526	272	1034	442	287	932	377
v/s Ratio Prot	0.03	0.23		c0.06	c0.25		c0.06	0.18		0.02	0.20	
v/s Ratio Perm	0.12		0.04	0.21		0.02	c0.21		0.04	0.08		0.01
v/c Ratio	0.38	0.71	0.14	0.60	0.69	0.04	0.69	0.57	0.14	0.27	0.71	0.04
Uniform Delay, d1	17.9	26.4	21.2	16.2	24.6	18.7	19.4	26.0	22.4	20.4	29.0	23.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.08	1.04	1.00
Incremental Delay, d2	1.0	4.0	0.6	3.2	3.5	0.2	7.4	0.7	0.1	0.4	2.3	0.0
Delay (s)	18.8	30.4	21.8	19.3	28.1	18.9	26.7	26.7	22.6	22.5	32.4	23.5
Level of Service	В	С	С	В	С	В	С	С	С	С	С	С
Approach Delay (s)		27.8			26.0			25.9			30.9	
Approach LOS		С			С			С			С	
Intersection Summary	•											
HCM 2000 Control Delay			27.5	Н	CM 2000	Level of	Service		С			
•	M 2000 Volume to Capacity ratio 0.73											
Actuated Cycle Length (s)	, ,				um of lost				18.0			
Intersection Capacity Utiliza				IC	CU Level	of Service	9		С			
Analysis Period (min)			15									
c Critical Lane Group												

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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations		4		4		4		4	
Traffic Volume (vph)	39	348	12	366	15	53	32	51	
Future Volume (vph)	39	348	12	366	15	53	32	51	
Lane Group Flow (vph)	0	446	0	440	0	90	0	156	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases		2		6		4		8	
Permitted Phases	2		6		4		8		
Detector Phase	2	2	6	6	4	4	8	8	
Switch Phase									
Minimum Initial (s)	18.0	18.0	18.0	18.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0	
Total Split (s)	50.0	50.0	50.0	50.0	25.0	25.0	25.0	25.0	
Total Split (%)	66.7%	66.7%	66.7%	66.7%	33.3%	33.3%	33.3%	33.3%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0		0.0		0.0	
Total Lost Time (s)		6.0		6.0		6.0		6.0	
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	
v/c Ratio		0.39		0.36		0.35		0.61	
Control Delay		6.9		6.5		26.7		29.9	
Queue Delay		0.0		0.0		0.0		0.0	
Total Delay		6.9		6.5		26.7		29.9	
Queue Length 50th (m)		21.8		20.8		9.8		14.4	
Queue Length 95th (m)		47.3		44.6		20.0		29.2	
Internal Link Dist (m)		237.5		168.5		115.4		103.8	
Turn Bay Length (m)									
Base Capacity (vph)		1146		1226		414		391	
Starvation Cap Reductn		0		0		0		0	
Spillback Cap Reductn		0		0		0		0	
Storage Cap Reductn		0		0		0		0	
Reduced v/c Ratio		0.39		0.36		0.22		0.40	

# Intersection Summary

Cycle Length: 75

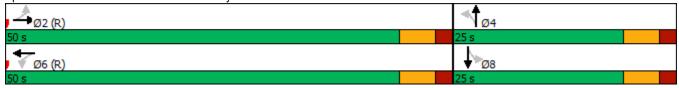
Actuated Cycle Length: 75

Offset: 43 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Splits and Phases: 9: Yorkshire St & Paisley St



	۶	<b>→</b>	•	•	<b>←</b>	•	•	†	~	<b>/</b>	<b>↓</b>	✓
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (vph)	39	348	24	12	366	27	15	53	15	32	51	61
Future Volume (vph)	39	348	24	12	366	27	15	53	15	32	51	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			0.99			0.99			0.92	
Flpb, ped/bikes		1.00			1.00			0.98			0.99	
Frt		0.99			0.99			0.98			0.94	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1779			1811			1709			1527	
Flt Permitted		0.93			0.99			0.93			0.91	
Satd. Flow (perm)		1671			1787			1597			1409	
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)	42	378	26	13	398	29	16	58	16	35	55	66
RTOR Reduction (vph)	0	2	0	0	3	0	0	12	0	0	40	0
Lane Group Flow (vph)	0	444	0	0	437	0	0	78	0	0	116	0
Confl. Peds. (#/hr)	55		28	28		55	85		23	23		85
Confl. Bikes (#/hr)			5									
Heavy Vehicles (%)	0%	4%	3%	8%	2%	0%	8%	2%	0%	0%	4%	7%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)		51.4			51.4			11.6			11.6	
Effective Green, g (s)		51.4			51.4			11.6			11.6	
Actuated g/C Ratio		0.69			0.69			0.15			0.15	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		1145			1224			247			217	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.24			0.05			c0.08	
v/c Ratio		0.39			0.36			0.32			0.54	
Uniform Delay, d1		5.1			4.9			28.2			29.2	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.8			0.7			2.5	
Delay (s)		6.0			5.7			28.9			31.8	
Level of Service		Α			Α			С			С	
Approach Delay (s)		6.0			5.7			28.9			31.8	
Approach LOS		Α			Α			С			С	
Intersection Summary												
HCM 2000 Control Delay			11.3	Н	CM 2000	Level of	Service		В			
HCM 2000 Volume to Capacity	ratio		0.41									
Actuated Cycle Length (s)			75.0	S	um of lost	time (s)			12.0			
Intersection Capacity Utilization	)		63.0%			of Service	!		В			
Analysis Period (min)			15									
c Critical Lane Group												

	•	<b>→</b>	*	<b>√</b>	+	4	•	†	<i>&gt;</i>	<b>/</b>	<b>+</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	35	198	6	11	234	13	5	20	20	29	12	57
Future Volume (vph)	35	198	6	11	234	13	5	20	20	29	12	57
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)	38	215	7	12	254	14	5	22	22	32	13	62
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	260	280	49	107								
Volume Left (vph)	38	12	5	32								
Volume Right (vph)	7	14	22	62								
Hadj (s)	0.06	0.03	-0.17	-0.23								
Departure Headway (s)	4.7	4.7	5.2	5.0								
Degree Utilization, x	0.34	0.36	0.07	0.15								
Capacity (veh/h)	725	739	603	641								
Control Delay (s)	10.1	10.3	8.6	8.9								
Approach Delay (s)	10.1	10.3	8.6	8.9								
Approach LOS	В	В	Α	Α								
Intersection Summary												
Delay			9.9									
Level of Service			Α									
Intersection Capacity Utiliza	tilization 46.0%		IC	U Level o	of Service	!		Α				
Analysis Period (min)			15									

	۶	<b>→</b>	•	•	<b>←</b>	4	•	<b>†</b>	<b>/</b>	<b>/</b>	<b></b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (veh/h)	14	294	12	16	350	5	13	24	18	4	20	7
Future Volume (Veh/h)	14	294	12	16	350	5	13	24	18	4	20	7
Sign Control		Free			Free			Stop			Stop	
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)	15	320	13	17	380	5	14	26	20	4	22	8
Pedestrians		7			1			11			14	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		1			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)		193			390							
pX, platoon unblocked				1.00			1.00	1.00	1.00	1.00	1.00	
vC, conflicting volume	399			344			810	800	338	821	804	404
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	399			342			809	799	336	820	803	404
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.3	6.5	6.3
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.7	4.0	3.4
p0 queue free %	99			99			95	91	97	98	93	99
cM capacity (veh/h)	1156			1214			266	305	702	239	303	627
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	348	402	60	34								
Volume Left	15	17	14	4								
Volume Right	13	5	20	8								
cSH	1156	1214	360	333								
Volume to Capacity	0.01	0.01	0.17	0.10								
Queue Length 95th (m)	0.3	0.3	4.5	2.6								
Control Delay (s)	0.5	0.5	17.0	17.0								
Lane LOS	Α	Α	С	С								
Approach Delay (s)	0.5	0.5	17.0	17.0								
Approach LOS			С	С								
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utiliza	ation		36.7%	IC	U Level	of Service			Α			
Analysis Period (min)			15									

	•	<b>→</b>	•	•	←	•	4	<b>†</b>	<i>&gt;</i>	-	ļ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (veh/h)	30	186	4	8	223	28	9	15	15	26	10	36
Future Volume (Veh/h)	30	186	4	8	223	28	9	15	15	26	10	36
Sign Control		Free			Free			Stop			Stop	
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)	33	202	4	9	242	30	10	16	16	28	11	39
Pedestrians		4			1			13			14	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		0			0			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					401							
pX, platoon unblocked												
vC, conflicting volume	286			219			606	587	218	584	574	275
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	286			219			606	587	218	584	574	275
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			99			97	96	98	93	97	95
cM capacity (veh/h)	1272			1347			361	401	807	383	408	756
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	239	281	42	78								
Volume Left	33	9	10	28								
Volume Right	4	30	16	39								
cSH	1272	1347	480	514								
Volume to Capacity	0.03	0.01	0.09	0.15								
Queue Length 95th (m)	0.6	0.2	2.2	4.0								
Control Delay (s)	1.3	0.3	13.2	13.2								
Lane LOS	A	A	В	В								
Approach Delay (s)	1.3	0.3	13.2	13.2								
Approach LOS	1.0	0.0	В	В								
Intersection Summary												
Average Delay			3.1									
Intersection Capacity Utiliza	ition		38.5%	IC	U Level	of Service			Α			
Analysis Period (min)	-		15		3.27							

	<b>≭</b>	<b>→</b>	*	•	<b>←</b>	*	1	<b>†</b>	-	ļ	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations	7	<b>↑</b>	7	7	<b>↑</b>	Ž.	7	1	Ä	1	
Traffic Volume (vph)	43	121	131	80	188	60	144	400	53	433	
Future Volume (vph)	43	121	131	80	188	60	144	400	53	433	
Lane Group Flow (vph)	47	132	142	87	204	65	157	488	58	506	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	pm+pt	NA	
Protected Phases		8		7	4		5	2	1	6	
Permitted Phases	8		8	4		4	2		6		
Detector Phase	8	8	8	7	4	4	5	2	1	6	
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	6.0	10.0	10.0	6.0	10.0	6.0	10.0	
Minimum Split (s)	29.0	29.0	29.0	9.0	29.0	29.0	9.0	31.0	9.0	31.0	
Total Split (s)	29.0	29.0	29.0	10.0	39.0	39.0	10.0	41.0	10.0	41.0	
Total Split (%)	32.2%	32.2%	32.2%	11.1%	43.3%	43.3%	11.1%	45.6%	11.1%	45.6%	
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	3.0	4.0	
All-Red Time (s)	2.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	0.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	3.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead			Lead	Lag	Lead	Lag	
Lead-Lag Optimize?											
Recall Mode	Max	Max	Max	None	Max	Max	None	C-Max	None	C-Max	
v/c Ratio	0.19	0.32	0.39	0.24	0.37	0.17	0.56	0.81	0.18	0.86	
Control Delay	28.9	29.5	8.5	19.1	23.2	20.8	16.6	29.7	11.7	42.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	28.9	29.5	8.5	19.1	23.2	20.8	16.6	29.7	11.7	42.1	
Queue Length 50th (m)	6.4	18.6	0.0	9.3	25.4	7.5	10.4	64.1	4.6	78.2	
Queue Length 95th (m)	15.5	34.4	14.3	18.9	43.3	16.6	19.7	#128.7	10.2	#135.5	
Internal Link Dist (m)		162.2			100.7			126.2		147.3	
Turn Bay Length (m)	30.0		20.0	35.0		35.0			25.0		
Base Capacity (vph)	249	419	365	367	558	386	280	605	320	586	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.19	0.32	0.39	0.24	0.37	0.17	0.56	0.81	0.18	0.86	

## Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

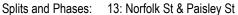
Offset: 30 (33%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

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

Queue shown is maximum after two cycles.





expm - Study Area A.syn 11/10/2021

	<b>⊿</b>	<b>→</b>	*	•	+	•	4	†	۲	-	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b>	7	7	<b>†</b>	Z.	7	1€		Ä	1	
Traffic Volume (vph)	43	121	131	80	188	60	144	400	49	53	433	32
Future Volume (vph)	43	121	131	80	188	60	144	400	49	53	433	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.71	1.00	1.00	0.83	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	0.89	1.00	1.00	0.88	1.00	1.00	0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1354	1510	947	1355	1523	1054	1502	1467		1522	1499	
Flt Permitted	0.63	1.00	1.00	0.60	1.00	1.00	0.25	1.00		0.31	1.00	
Satd. Flow (perm)	898	1510	947	857	1523	1054	392	1467		493	1499	
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)	47	132	142	87	204	65	157	435	53	58	471	35
RTOR Reduction (vph)	0	0	103	0	0	0	0	0	0	0	3	0
Lane Group Flow (vph)	47	132	39	87	204	65	157	488	0	58	503	0
Confl. Peds. (#/hr)	78		139	139		78	75		78	78		75
Confl. Bikes (#/hr)			2			2			11			6
Heavy Vehicles (%)	5%	12%	8%	4%	11%	13%	6%	12%	6%	4%	10%	16%
Parking (#/hr)												
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2			6		
Actuated Green, G (s)	25.0	25.0	25.0	33.6	33.6	33.6	42.9	35.9		39.9	34.4	
Effective Green, g (s)	25.0	25.0	25.0	33.6	33.6	33.6	42.9	35.9		39.9	34.4	
Actuated g/C Ratio	0.28	0.28	0.28	0.37	0.37	0.37	0.48	0.40		0.44	0.38	
Clearance Time (s)	6.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	249	419	263	350	568	393	273	585		281	572	
v/s Ratio Prot		0.09		0.02	c0.13		c0.04	0.33		0.01	c0.34	
v/s Ratio Perm	0.05		0.04	0.08		0.06	0.23			0.08		
v/c Ratio	0.19	0.32	0.15	0.25	0.36	0.17	0.58	0.83		0.21	0.88	
Uniform Delay, d1	24.8	25.7	24.5	18.9	20.4	18.8	15.8	24.4		15.5	25.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.74		1.00	1.00	
Incremental Delay, d2	1.7	2.0	1.2	0.4	1.8	0.9	2.6	11.9		0.4	17.4	
Delay (s)	26.4	27.7	25.7	19.3	22.2	19.7	15.4	30.0		15.8	43.2	
Level of Service	С	С	С	В	С	В	В	С		В	D	
Approach Delay (s)		26.6			21.0			26.4			40.4	
Approach LOS		С			С			С			D	
Intersection Summary												
HCM 2000 Control Delay			29.6	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capa	city ratio											
Actuated Cycle Length (s)	(s) 90.0			S	um of lost	time (s)			18.0			
Intersection Capacity Utiliza				IC	U Level	of Service	9		Е			
Analysis Period (min)			15									
c Critical Lane Group												

	۶	<b>→</b>	•	•	+	•	1	<b>†</b>	~	/	<b>↓</b>	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			413		7	<b>₽</b>	
Traffic Volume (veh/h)	5	5	25	18	7	50	21	652	34	39	689	22
Future Volume (Veh/h)	5	5	25	18	7	50	21	652	34	39	689	22
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	5	27	20	8	54	23	709	37	42	749	24
Pedestrians		52			63			3			6	
Lane Width (m)		3.5			3.5			3.5			3.5	
Walking Speed (m/s)		1.1			1.1			1.1			1.1	
Percent Blockage		5			6			0			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								294			150	
pX, platoon unblocked	0.72	0.72	0.72	0.72	0.72		0.72					
vC, conflicting volume	1362	1752	816	1702	1746	442	825			809		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1308	1849	552	1780	1840	442	564			809		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	89	92	24	82	90	97			95		
cM capacity (veh/h)	55	45	331	26	45	534	700			779		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	37	82	378	392	42	773						
Volume Left	5	20	23	0	42	0						
Volume Right	27	54	0	37	0	24						
cSH	130	79	700	1700	779	1700						
Volume to Capacity	0.28	1.04	0.03	0.23	0.05	0.45						
Queue Length 95th (m)	8.3	43.7	0.8	0.0	1.3	0.0						
Control Delay (s)	43.3	205.9	1.0	0.0	9.9	0.0						
Lane LOS	Е	F	Α		Α							
Approach Delay (s)	43.3	205.9	0.5		0.5							
Approach LOS	Е	F										
Intersection Summary												
Average Delay			11.3									
Intersection Capacity Utilizat	tion		58.0%	IC	U Level	of Service			В			
Analysis Period (min)			15									

# 15: Gordon St/Norfolk St & Waterloo Ave/Wilson St

	•	*	1	<b>†</b>	<b>↓</b>	
Lane Group	EBL	EBR	NBL	NBT	SBT	Ø4
Lane Configurations	*	7	×	<b>†</b>	<b>†</b>	
Traffic Volume (vph)	134	145	102	524	602	
Future Volume (vph)	134	145	102	524	602	
Lane Group Flow (vph)	146	158	111	570	828	
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	4
Permitted Phases	8	8	2			
Minimum Split (s)	31.0	31.0	9.0	34.0	34.0	23.5
Total Split (s)	32.0	32.0	10.0	58.0	48.0	32.0
Total Split (%)	35.6%	35.6%	11.1%	64.4%	53.3%	36%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0	3.0	6.0	6.0	
Lead/Lag			Lead		Lag	
Lead-Lag Optimize?						
v/c Ratio	0.42	0.33	0.33	0.60	0.58	
Control Delay	30.4	6.3	10.1	15.7	24.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	30.4	6.3	10.1	15.7	24.2	
Queue Length 50th (m)	20.3	0.0	7.3	59.0	68.2	
Queue Length 95th (m)	37.6	13.6	14.0	90.2	m81.6	
Internal Link Dist (m)				178.2	178.4	
Turn Bay Length (m)	30.0	100.0				
Base Capacity (vph)	349	479	336	948	1417	
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	0.42	0.33	0.33	0.60	0.58	

# Intersection Summary

Cycle Length: 90

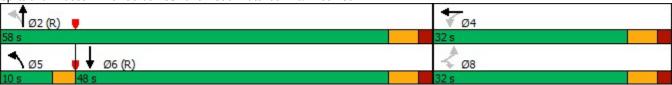
Actuated Cycle Length: 90

Offset: 10 (11%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 75 Control Type: Pretimed

m Volume for 95th percentile queue is metered by upstream signal.





	۶	<b>→</b>	•	•	<b>←</b>	•	4	†	~	1	<b></b>	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7		7		4		7	<b>^</b>			<b>†</b>	
Traffic Volume (vph)	134	0	145	0	0	0	102	524	0	0	602	160
Future Volume (vph)	134	0	145	0	0	0	102	524	0	0	602	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0				3.0	6.0			6.0	
Lane Util. Factor	1.00		1.00				1.00	1.00			0.95	
Frpb, ped/bikes	1.00		0.89				1.00	1.00			0.98	
Flpb, ped/bikes	0.96		1.00				1.00	1.00			1.00	
Frt	1.00		0.85				1.00	1.00			0.97	
Flt Protected	0.95		1.00				0.95	1.00			1.00	
Satd. Flow (prot)	1518		1272				1569	1642			2981	
FIt Permitted	0.76		1.00				0.25	1.00			1.00	
Satd. Flow (perm)	1210		1272				407	1642			2981	
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)	146	0	158	0	0	0	111	570	0	0	654	174
RTOR Reduction (vph)	0	0	112	0	0	0	0	0	0	0	27	0
Lane Group Flow (vph)	146	0	46	0	0	0	111	570	0	0	801	0
Confl. Peds. (#/hr)	12		89	89		12	45		13	13		45
Confl. Bikes (#/hr)									4			1
Heavy Vehicles (%)	2%	0%	1%	0%	0%	0%	2%	3%	0%	0%	3%	0%
Turn Type	Perm		Perm				pm+pt	NA			NA	
Protected Phases					4		5	2			6	
Permitted Phases	8		8	4			2					
Actuated Green, G (s)	26.0		26.0				52.0	52.0			42.0	
Effective Green, g (s)	26.0		26.0				52.0	52.0			42.0	
Actuated g/C Ratio	0.29		0.29				0.58	0.58			0.47	
Clearance Time (s)	6.0		6.0				3.0	6.0			6.0	
Lane Grp Cap (vph)	349		367				325	948			1391	
v/s Ratio Prot							0.03	c0.35			0.27	
v/s Ratio Perm	c0.12		0.04				0.17					
v/c Ratio	0.42		0.12				0.34	0.60			0.58	
Uniform Delay, d1	25.9		23.6				9.7	12.3			17.5	
Progression Factor	1.00		1.00				1.00	1.00			1.36	
Incremental Delay, d2	3.7		0.7				2.8	2.8			1.5	
Delay (s)	29.5		24.3				12.5	15.1			25.3	
Level of Service	С		С				В	В			С	
Approach Delay (s)		26.8			0.0			14.7			25.3	
Approach LOS		С			Α			В			С	
Intersection Summary												
HCM 2000 Control Delay			21.6	H	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capac	ity ratio		0.56						15.3			
Actuated Cycle Length (s)			90.0		um of lost				15.0			
Intersection Capacity Utilizati	ion		57.4%	IC	U Level o	of Service	9		В			
Analysis Period (min)			15									

c Critical Lane Group

	•	-	1	<b>←</b>	4	<b>†</b>	1	-	<b>↓</b>
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations	*	<b>†</b>	*	<b>†</b>	*	<b>^</b>	7	*	<b>↑</b> ↑
Traffic Volume (vph)	132	707	118	808	128	660	33	405	576
Future Volume (vph)	132	707	118	808	128	660	33	405	576
Lane Group Flow (vph)	143	846	128	1188	139	717	36	440	688
Turn Type	pm+pt	NA	pm+pt	NA	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	5	2	1	6	7	4		3	8
Permitted Phases	2		6		4		4	8	
Detector Phase	5	2	1	6	7	4	4	3	8
Switch Phase									
Minimum Initial (s)	6.0	10.0	6.0	10.0	6.0	7.0	7.0	6.0	7.0
Minimum Split (s)	9.0	34.0	9.0	34.0	9.0	33.0	33.0	9.0	33.0
Total Split (s)	19.0	35.0	19.0	35.0	10.0	36.0	36.0	10.0	36.0
Total Split (%)	19.0%	35.0%	19.0%	35.0%	10.0%	36.0%	36.0%	10.0%	36.0%
Yellow Time (s)	3.0	4.0	3.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	0.0	2.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	3.0	6.0	3.0	6.0	6.0	3.0	6.0
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	C-Max	None	C-Max	None	Max	Max	None	Max
v/c Ratio	0.60	0.79	0.51	1.12	0.58	0.78	0.08	1.95	0.74
Control Delay	27.3	36.7	20.9	97.8	29.0	39.1	0.3	462.8	36.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.3	36.7	20.9	97.8	29.0	39.1	0.3	462.8	36.7
Queue Length 50th (m)	14.3	75.5	12.8	~135.8	16.4	66.6	0.0	~122.8	61.9
Queue Length 95th (m)	30.6	#119.1	23.1	#193.0	29.0	88.2	0.0	#190.1	82.5

183.2

1061

0

0

0

1.12

110.0

318

0

0

0.40

222.9

918

0

0

0

0.78

55.0

475

0

0

0

0.08

80.0

240

0

0

0

0.58

157.4

930

0

0

0

0.74

35.0

226

0

0

0

1.95

## Intersection Summary

Internal Link Dist (m)

Turn Bay Length (m)

Base Capacity (vph)

Starvation Cap Reductn

Spillback Cap Reductn

Storage Cap Reductn

Reduced v/c Ratio

Cycle Length: 100
Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

223.6

1069

0

0

0.79

65.0

312

0

0

0

0.46

Natural Cycle: 125

Control Type: Actuated-Coordinated

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: 16: Wellington St & Gordon St



11/10/2021 Page 26

	۶	<b>→</b>	•	•	<b>+</b>	•	1	<b>†</b>	~	-	<b>↓</b>	<b>√</b>
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>↑</b> ↑		M	<b>†</b> 1>		7	<b>^</b>	7	7	<b>†</b> 1>	
Traffic Volume (vph)	132	707	72	118	808	285	128	660	33	405	576	57
Future Volume (vph)	132	707	72	118	808	285	128	660	33	405	576	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		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	1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1545	3102		1409	3011		1573	3060	1356	1545	3078	
Flt Permitted	0.12	1.00		0.18	1.00		0.24	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	190	3102		269	3011		396	3060	1356	358	3078	
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)	143	768	78	128	878	310	139	717	36	440	626	62
RTOR Reduction (vph)	0	7	0	0	33	0	0	0	25	0	8	0
Lane Group Flow (vph)	143	839	0	128	1155	0	139	717	11	440	680	0
Confl. Peds. (#/hr)	12		11	11		12	14					14
Confl. Bikes (#/hr)			2			23						
Heavy Vehicles (%)	4%	2%	1%	14%	2%	0%	2%	5%	6%	4%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6	_		4		4	8		
Actuated Green, G (s)	45.0	34.2		45.0	34.2		37.0	30.0	30.0	37.0	30.0	
Effective Green, g (s)	45.0	34.2		45.0	34.2		37.0	30.0	30.0	37.0	30.0	
Actuated g/C Ratio	0.45	0.34		0.45	0.34		0.37	0.30	0.30	0.37	0.30	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	231	1060		244	1029		228	918	406	215	923	
v/s Ratio Prot	c0.07	0.27		0.06	c0.38		0.04	0.23	100	c0.14	0.22	
v/s Ratio Perm	0.21	0.21		0.18	00.00		0.18	0.20	0.01	c0.61	V.LL	
v/c Ratio	0.62	0.79		0.52	1.12		0.61	0.78	0.03	2.05	0.74	
Uniform Delay, d1	21.4	29.7		18.3	32.9		22.6	32.0	24.7	28.8	31.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.9	6.0		2.0	68.1		4.6	6.6	0.1	486.8	5.2	
Delay (s)	26.3	35.7		20.3	101.0		27.2	38.6	24.8	515.6	36.7	
Level of Service	C	D		C	F		C	D D	C	F	D	
Approach Delay (s)		34.4			93.2			36.2		•	223.5	
Approach LOS		C			F			D			F	
Intersection Summary												
HCM 2000 Control Delay			102.0	Н	CM 2000	Level of	Service		F			
HCM 2000 Volume to Capa	acity ratio		1.47									
Actuated Cycle Length (s)			100.0	S	um of lost	time (s)			18.0			
Intersection Capacity Utiliza	ation		105.3%	IC	CU Level	of Service	)		G			_
Analysis Period (min)			15									
c Critical Lane Group												

₩ Ø6 (R)

	Ī	<b>↓</b>	
Lane Group	NBT	SBT	Ø3
Lane Configurations	<b>†</b>	<b>↑</b>	
Traffic Volume (vph)	630	687	
Future Volume (vph)	630	687	
Lane Group Flow (vph)	685	747	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag	10.0	10.0	
Lead-Lag Optimize?			
v/c Ratio	0.42	0.46	
Control Delay	7.9	8.5	
Queue Delay	5.4	0.0	
Total Delay	13.3	8.5	
Queue Length 50th (m)	154.4	178.0	
Queue Length 95th (m)	163.8	187.6	
Internal Link Dist (m)	121.2	63.2	
Turn Bay Length (m)	121.2	55.Z	
Base Capacity (vph)	1617	1617	
Starvation Cap Reductn	855	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.90	0.46	
	0.50	0.40	
Intersection Summary			
Cycle Length: 600			
Actuated Cycle Length: 600			
Offset: 0 (0%), Referenced		NBT and	6:SBT, St
Natural Cycle: 600	<u> </u>		
Control Type: Pretimed			
<b>,</b> ,			
Splits and Phases: 18: Ed	dinburgh Ro	d & Rail C	rossing
<b>A</b>			
Ø2 (R)			
542 S			

	<b>≭</b>	*	1	<b>†</b>	*	L <sub>a</sub>	Ţ	4	4	1	
Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR	
Lane Configurations				<b>^</b>			<b>^</b>				
Traffic Volume (vph)	0	0	0	630	0	0	687	0	0	0	
Future Volume (vph)	0	0	0	630	0	0	687	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				15.0			15.0				
Lane Util. Factor				1.00			1.00				
Frt				1.00			1.00				
FIt Protected				1.00			1.00				
Satd. Flow (prot)				1842			1842				
Flt Permitted				1.00			1.00				
Satd. Flow (perm)				1842			1842				
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	0	685	0	0	747	0	0	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	0	0	685	0	0	747	0	0	0	
Turn Type				NA			NA				
Protected Phases				2			6				
Permitted Phases											
Actuated Green, G (s)				527.0			527.0				
Effective Green, g (s)				527.0			527.0				
Actuated g/C Ratio				0.88			0.88				
Clearance Time (s)				15.0			15.0				
Lane Grp Cap (vph)				1617			1617				
v/s Ratio Prot				0.37			c0.41				
v/s Ratio Perm											
v/c Ratio				0.42			0.46				
Uniform Delay, d1				7.1			7.5				
Progression Factor				1.00			1.00				
Incremental Delay, d2				0.8			1.0				
Delay (s)				7.9			8.4				
Level of Service				Α			Α				
Approach Delay (s)	0.0			7.9			8.4		0.0		
Approach LOS	Α			Α			Α		Α		
Intersection Summary											
HCM 2000 Control Delay			8.2	H	CM 2000	Level of S	Service		Α		<u> </u>
HCM 2000 Volume to Capacity	y ratio		0.42								
Actuated Cycle Length (s)			600.0	Sı	um of lost	time (s)			27.0		
Intersection Capacity Utilizatio	n	4	451.7%		U Level c				Н		
Analysis Period (min)			15								
c Critical Lane Group											

# 19: Alma St & Rail Crossing

Lane Group         NBT         SBT         Ø3           Lane Configurations         ↑         ↑           Traffic Volume (vph)         88         215           Future Volume (vph)         88         215           Lane Group Flow (vph)         96         234           Turn Type         NA         NA           Permitted Phases         2         6         3           Permitted Phases         2         6         3           Minimum Split (s)         542.0         542.0         58.0           Total Split (%)         90.3%         90.3%         10%           Yellow Time (s)         10.0         10.0         10.0           Yellow Time (s)         5.0         5.0         2.0           Lost Time (s)         5.0         5.0         2.0           Lost Time Adjust (s)         0.0         0.0         0.0           Total Lost Time (s)         15.0         15.0         15.0           Lead/Lag         Lead-Lag Optimize?         v/c Ratio         0.06         0.14           Control Delay         4.8         5.3         2.0           Queue Length 50th (m)         14.3         37.9           Queue Length 95th (m) </th <th></th> <th><b>†</b></th> <th><b>↓</b></th> <th></th>		<b>†</b>	<b>↓</b>	
Lane Configurations         ↑           Traffic Volume (vph)         88         215           Future Volume (vph)         88         215           Lane Group Flow (vph)         96         234           Turn Type         NA         NA           Protected Phases         2         6         3           Permitted Phases         Minimum Split (s)         542.0         542.0         58.0           Minimum Split (s)         542.0         542.0         58.0           Total Split (%)         90.3%         90.3%         10%           Yellow Time (s)         10.0         10.0         10.0           All-Red Time (s)         5.0         5.0         2.0           Lost Time Adjust (s)         0.0         0.0         0.0           Total Lost Time (s)         15.0         15.0         15.0           Lead/Lag         Lead-Lag Optimize?         v/c Ratio         0.06         0.14           Control Delay         4.8         5.3         Queue Delay         1.2           Total Delay         4.8         6.5         Queue Length 50th (m)         14.3         37.9           Queue Length 95th (m)         18.5         44.0         175.4	Lane Group	NBT	SBT	Ø3
Traffic Volume (vph) 88 215 Future Volume (vph) 88 215 Lane Group Flow (vph) 96 234 Turn Type NA NA Protected Phases 2 6 3 Permitted Phases Minimum Split (s) 542.0 542.0 58.0 Total Split (s) 542.0 542.0 58.0 Total Split (%) 90.3% 90.3% 10% Yellow Time (s) 10.0 10.0 10.0 All-Red Time (s) 5.0 5.0 2.0 Lost Time Adjust (s) 15.0 15.0 Lead/Lag Lead-Lag Optimize? v/c Ratio 0.06 0.14 Control Delay 4.8 5.3 Queue Delay 0.0 1.2 Total Delay 4.8 6.5 Queue Length 50th (m) 14.3 37.9 Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle: 600 Control Type: Pretimed				
Future Volume (vph) 88 215  Lane Group Flow (vph) 96 234  Turn Type NA NA  Protected Phases 2 6 3  Permitted Phases  Minimum Split (s) 542.0 542.0 58.0  Total Split (s) 542.0 542.0 58.0  Total Split (w) 90.3% 90.3% 10%  Yellow Time (s) 10.0 10.0 10.0  All-Red Time (s) 5.0 5.0 2.0  Lost Time Adjust (s) 15.0 15.0  Lead/Lag  Lead-Lag Optimize?  v/c Ratio 0.06 0.14  Control Delay 4.8 5.3  Queue Delay 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle: 600  Control Type: Pretimed				
Lane Group Flow (vph) 96 234  Turn Type NA NA  Protected Phases 2 6 3  Permitted Phases  Minimum Split (s) 542.0 542.0 58.0  Total Split (s) 542.0 542.0 58.0  Total Split (w) 90.3% 90.3% 10%  Yellow Time (s) 10.0 10.0 10.0  All-Red Time (s) 5.0 5.0 2.0  Lost Time Adjust (s) 0.0 0.0  Total Lost Time (s) 15.0 15.0  Lead/Lag  Lead-Lag Optimize?  v/c Ratio 0.06 0.14  Control Delay 4.8 5.3  Queue Delay 0.0 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Control Type: Pretimed				
Turn Type NA NA Protected Phases 2 6 3 Permitted Phases Minimum Split (s) 542.0 542.0 58.0 Total Split (s) 90.3% 90.3% 10% Yellow Time (s) 10.0 10.0 10.0 All-Red Time (s) 5.0 5.0 2.0 Lost Time Adjust (s) 0.0 0.0 Total Lost Time (s) 15.0 15.0 Lead/Lag Lead-Lag Optimize? v/c Ratio 0.06 0.14 Control Delay 4.8 5.3 Queue Delay 0.0 1.2 Total Delay 4.8 6.5 Queue Length 50th (m) 14.3 37.9 Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 Control Type: Pretimed				
Protected Phases Permitted Phases Minimum Split (s) Total Split (s) Total Split (%) Yellow Time (s) Lost Time Adjust (s) Total Lost Time (s) Lead/Lag Lead-Lag Optimize? v/c Ratio Oueue Delay Queue Delay Queue Length 50th (m) Internal Link Dist (m) Base Capacity (vph) Spillback Cap Reductn Strate Signary Cycle Length: 600 Control Type: Pretimed  2 6 3 Permitted Phases Permitted Phases Phases Page 42.0 58.0 58.0 58.0 58.0 58.0 58.0 58.0 58		NA	NA	
Minimum Split (s) 542.0 542.0 58.0 Total Split (s) 542.0 542.0 58.0 Total Split (%) 90.3% 90.3% 10% Yellow Time (s) 10.0 10.0 10.0 All-Red Time (s) 5.0 5.0 2.0 Lost Time Adjust (s) 0.0 0.0 Total Lost Time (s) 15.0 15.0 Lead/Lag Lead-Lag Optimize? v/c Ratio 0.06 0.14 Control Delay 4.8 5.3 Queue Delay 0.0 1.2 Total Delay 4.8 6.5 Queue Length 50th (m) 14.3 37.9 Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51 Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Si Natural Cycle: 600 Control Type: Pretimed		2	6	3
Total Split (s) 542.0 542.0 58.0 Total Split (%) 90.3% 90.3% 10% Yellow Time (s) 10.0 10.0 10.0 All-Red Time (s) 5.0 5.0 2.0 Lost Time Adjust (s) 0.0 0.0 Total Lost Time (s) 15.0 15.0 Lead/Lag Lead-Lag Optimize? v/c Ratio 0.06 0.14 Control Delay 4.8 5.3 Queue Delay 0.0 1.2 Total Delay 4.8 6.5 Queue Length 50th (m) 14.3 37.9 Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51 Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, St Natural Cycle: 600 Control Type: Pretimed	Permitted Phases			
Total Split (%) 90.3% 90.3% 10% Yellow Time (s) 10.0 10.0 10.0 10.0 10.0 All-Red Time (s) 5.0 5.0 2.0 Lost Time Adjust (s) 0.0 0.0 Total Lost Time (s) 15.0 15.0 Lead/Lag Lead-Lag Optimize? v/c Ratio 0.06 0.14 Control Delay 4.8 5.3 Queue Delay 0.0 1.2 Total Delay 4.8 6.5 Queue Length 50th (m) 14.3 37.9 Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 0 Reduced v/c Ratio 0.06 0.51 Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, St Natural Cycle: 600 Control Type: Pretimed	Minimum Split (s)	542.0	542.0	58.0
Yellow Time (s)       10.0       10.0       10.0         All-Red Time (s)       5.0       5.0       2.0         Lost Time Adjust (s)       0.0       0.0         Total Lost Time (s)       15.0       15.0         Lead/Lag       15.0       15.0         Lead-Lag Optimize?       v/c Ratio       0.06       0.14         Control Delay       4.8       5.3         Queue Delay       0.0       1.2         Total Delay       4.8       6.5         Queue Length 50th (m)       14.3       37.9         Queue Length 95th (m)       18.5       44.0         Internal Link Dist (m)       68.0       175.4         Turn Bay Length (m)       8ase Capacity (vph)       1617       1617         Starvation Cap Reductn       0       0       0         Spillback Cap Reductn       0       0       0         Storage Cap Reductn       0       0       0.51         Intersection Summary       Cycle Length: 600         Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, St         Natural Cycle: 600         Control Type: Pretimed	Total Split (s)	542.0	542.0	58.0
All-Red Time (s) 5.0 5.0 2.0  Lost Time Adjust (s) 0.0 0.0  Total Lost Time (s) 15.0 15.0  Lead/Lag  Lead-Lag Optimize?  v/c Ratio 0.06 0.14  Control Delay 4.8 5.3  Queue Delay 0.0 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Startal Cycle: 600  Control Type: Pretimed		90.3%	90.3%	10%
Lost Time Adjust (s) 0.0 0.0  Total Lost Time (s) 15.0 15.0  Lead/Lag  Lead-Lag Optimize?  v/c Ratio 0.06 0.14  Control Delay 4.8 5.3  Queue Delay 0.0 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Startal Cycle: 600  Control Type: Pretimed	Yellow Time (s)	10.0	10.0	
Total Lost Time (s) 15.0 15.0  Lead/Lag  Lead-Lag Optimize?  v/c Ratio 0.06 0.14  Control Delay 4.8 5.3  Queue Delay 0.0 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Starvation Type: Pretimed	All-Red Time (s)	5.0		2.0
Lead-Lag Optimize?  v/c Ratio  Control Delay  4.8  5.3  Queue Delay  0.0  1.2  Total Delay  4.8  6.5  Queue Length 50th (m)  14.3  37.9  Queue Length 95th (m)  18.5  44.0  Internal Link Dist (m)  Base Capacity (vph)  5tarvation Cap Reductn  Spillback Cap Reductn  Spillback Cap Reductn  Reduced v/c Ratio  O  Cotrol Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Starvation Type: Pretimed				
Lead-Lag Optimize?  v/c Ratio  0.06  0.14  Control Delay  4.8  5.3  Queue Delay  0.0  1.2  Total Delay  4.8  6.5  Queue Length 50th (m)  14.3  37.9  Queue Length 95th (m)  18.5  44.0  Internal Link Dist (m)  Base Capacity (vph)  1617  Starvation Cap Reductn  5yillback Cap Reductn  Cap Reduc		15.0	15.0	
v/c Ratio         0.06         0.14           Control Delay         4.8         5.3           Queue Delay         0.0         1.2           Total Delay         4.8         6.5           Queue Length 50th (m)         14.3         37.9           Queue Length 95th (m)         18.5         44.0           Internal Link Dist (m)         68.0         175.4           Turn Bay Length (m)         8ase Capacity (vph)         1617         1617           Starvation Cap Reductn         0         0         0           Spillback Cap Reductn         0         0         0           Storage Cap Reductn         0         0         0           Reduced v/c Ratio         0.06         0.51           Intersection Summary           Cycle Length: 600         0           Actuated Cycle Length: 600           Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, St           Natural Cycle: 600           Control Type: Pretimed				
Control Delay 4.8 5.3  Queue Delay 0.0 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Statural Cycle: 600  Control Type: Pretimed				
Queue Delay 0.0 1.2  Total Delay 4.8 6.5  Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S  Natural Cycle: 600  Control Type: Pretimed				
Total Delay 4.8 6.5 Queue Length 50th (m) 14.3 37.9 Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed	•			
Queue Length 50th (m) 14.3 37.9  Queue Length 95th (m) 18.5 44.0  Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S  Natural Cycle: 600  Control Type: Pretimed				
Queue Length 95th (m) 18.5 44.0 Internal Link Dist (m) 68.0 175.4 Turn Bay Length (m) Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed				
Internal Link Dist (m) 68.0 175.4  Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S  Natural Cycle: 600  Control Type: Pretimed				
Turn Bay Length (m)  Base Capacity (vph) 1617 1617  Starvation Cap Reductn 0 1159  Spillback Cap Reductn 0 0  Storage Cap Reductn 0 0  Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S  Natural Cycle: 600  Control Type: Pretimed				
Base Capacity (vph) 1617 1617 Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed		68.0	175.4	
Starvation Cap Reductn 0 1159 Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed				
Spillback Cap Reductn 0 0 Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed				
Storage Cap Reductn 0 0 Reduced v/c Ratio 0.06 0.51  Intersection Summary Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed				
Reduced v/c Ratio 0.06 0.51  Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S  Natural Cycle: 600  Control Type: Pretimed				
Intersection Summary  Cycle Length: 600  Actuated Cycle Length: 600  Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S  Natural Cycle: 600  Control Type: Pretimed				
Cycle Length: 600 Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed	Reduced v/c Ratio	0.06	0.51	
Actuated Cycle Length: 600 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed				
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, S Natural Cycle: 600 Control Type: Pretimed				
Natural Cycle: 600 Control Type: Pretimed	Actuated Cycle Length: 600			
Control Type: Pretimed	Offset: 0 (0%), Referenced	to phase 2:	:NBT and	6:SBT, St
•	Natural Cycle: 600			
Splits and Phases: 19: Alma St & Rail Crossing	Control Type: Pretimed			
SUITS ATTUCTIONS 19. ATTIO ST & RAIL CIOSSING	Splits and Phases: 10: Al	ma Ct & Da	oil Crossin	a
<b>A</b>	Spins and Phases. 19: Al	ilia St & Ka	ali Crossin	y
Tø2 (R)	Tø2 (R)			

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>^</b>			<b>^</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	88	0	0	215	0
Future Volume (vph)	0	0	0	0	0	0	0	88	0	0	215	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1842			1842	
FIt Permitted								1.00			1.00	
Satd. Flow (perm)								1842			1842	
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)	0	0	0	0	0	0	0	96	0	0	234	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	96	0	0	234	0
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1617			1617	
v/s Ratio Prot								0.05			c0.13	
v/s Ratio Perm												
v/c Ratio								0.06			0.14	
Uniform Delay, d1								4.7			5.1	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.2	
Delay (s)								4.8			5.3	
Level of Service								Α			Α	
Approach Delay (s)		0.0			0.0			4.8			5.3	
Approach LOS		Α			Α			Α			Α	
Intersection Summary												
HCM 2000 Control Delay			5.1	H	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity r	atio		0.13									
Actuated Cycle Length (s)			600.0	Sı	um of lost	time (s)			27.0			
Intersection Capacity Utilization		4	451.7%	IC	U Level o	of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												

	<b>†</b>	ļ	
Lane Group	NBT	SBT	Ø3
Lane Configurations	*	<u> </u>	
Traffic Volume (vph)	85	128	
Future Volume (vph)	85	128	
Lane Group Flow (vph)	92	139	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.06	0.09	
Control Delay	4.8	4.9	
Queue Delay	0.0	0.0	
Total Delay	4.8	4.9	
Queue Length 50th (m)	13.7	21.3	
Queue Length 95th (m)	17.8	26.2	
Internal Link Dist (m)	45.7	70.8	
Turn Bay Length (m)			
Base Capacity (vph)	1617	1617	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.06	0.09	
Intersection Summary			
Cycle Length: 600			
Actuated Cycle Length: 600			
Offset: 0 (0%), Referenced to		NBT and	6:SBT, S
Natural Cycle: 600			
Control Type: Pretimed			
Splits and Phases: 20: Ra	ail Crossing	g & Yorksh	nire St
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542 s			
CONTRACTOR OF THE PARTY OF THE			
▼ Ø6 (R)			
542 s			

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>^</b>			<b>^</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	85	0	0	128	0
Future Volume (vph)	0	0	0	0	0	0	0	85	0	0	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1842			1842	
FIt Permitted								1.00			1.00	
Satd. Flow (perm)								1842			1842	
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)	0	0	0	0	0	0	0	92	0	0	139	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	92	0	0	139	0
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1617			1617	
v/s Ratio Prot								0.05			c0.08	
v/s Ratio Perm												
v/c Ratio								0.06			0.09	
Uniform Delay, d1								4.7			4.8	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								4.7			4.9	
Level of Service								Α			Α	
Approach Delay (s)		0.0			0.0			4.7			4.9	
Approach LOS		Α			Α			Α			Α	
Intersection Summary												
HCM 2000 Control Delay			4.8	H	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	ratio		0.08									
Actuated Cycle Length (s)			600.0		um of lost				27.0			
Intersection Capacity Utilization			451.7%	IC	U Level o	of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												

	<b>†</b>	<b>↓</b>	
Lane Group	NBT	SBT	Ø3
Lane Configurations	<b>†</b>	<b>↑</b>	
Traffic Volume (vph)	91	65	
Future Volume (vph)	91	65	
Lane Group Flow (vph)	99	71	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.06	0.04	
Control Delay	4.8	4.7	
Queue Delay	0.0	0.0	
Total Delay	4.8	4.7	
Queue Length 50th (m)	14.8	10.5	
Queue Length 95th (m)	19.0	14.2	
Internal Link Dist (m)	125.5	52.5	
Turn Bay Length (m)			
Base Capacity (vph)	1617	1617	
Starvation Cap Reductn	0	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	0.06	0.04	
Intersection Summary			
Cycle Length: 600			
Actuated Cycle Length: 600			
Offset: 0 (0%), Referenced		NBT and (	6:SBT. St
Natural Cycle: 600			
Control Type: Pretimed			
<i>,</i> .			
Splits and Phases: 21: Gl	asgow St.	& Rail Cro	ssing
↑ Ø2 (R)			
542 s			
▼ Ø6 (R)			

	۶	<b>→</b>	*	1	<b>—</b>	•	1	1	~	-	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>^</b>			<b>^</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	91	0	0	65	0
Future Volume (vph)	0	0	0	0	0	0	0	91	0	0	65	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
Flt Protected								1.00			1.00	
Satd. Flow (prot)								1842			1842	
FIt Permitted								1.00			1.00	
Satd. Flow (perm)								1842			1842	
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)	0	0	0	0	0	0	0	99	0	0	71	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	99	0	0	71	0
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1617			1617	
v/s Ratio Prot								c0.05			0.04	
v/s Ratio Perm												
v/c Ratio								0.06			0.04	
Uniform Delay, d1								4.7			4.6	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.1			0.1	
Delay (s)								4.8			4.7	
Level of Service								Α			Α	
Approach Delay (s)		0.0			0.0			4.8			4.7	
Approach LOS		Α			Α			Α			Α	
Intersection Summary												
HCM 2000 Control Delay			4.7	H	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	ratio		0.06									
Actuated Cycle Length (s)			600.0	Sı	um of lost	time (s)			27.0			
Intersection Capacity Utilization		4	451.7%	IC	U Level o	of Service			Н			
Analysis Period (min)			15									
c Critical Lane Group												



**APPENDIX D** 

# TRAIN DATA AND MODELING ASSUMPTIONS

GUELPH TRANSPORTATION STUDY - ASSU	JMPTIONS	FOR MODELING RAIL CROSSINGS
Train Operations Timings		Notes
a) Crossing Width (m)	20.0	
b) Train Length (m)		
# of Cars	7.0	
Car Length (m)	25.9	
Locomotive Length (m)	20.7	
Total length (m)	202.0	
Inter-car space (m)	8.0	
c) Net Total Length (m)	210.0	
d) Train Speed (km/h)	20.0	Taken from Cargo and Passenger Data
e) Time for train to cross (s)	41.4	[a + c]/d)
f) Gate Opening Time (s)	12.0	
g) Time for Gate to be Closed prior to train arriv	5.0	
h) Total Time of Train Operation (s)	58.4	[e + f + g]
Signal Timing Calculations		Notes
i) Peak Hour (s)	3600	
j) Hold Split per train (s)	58.4	[h]
k) # of Trains	6	
I) Cycle Length (s)	600	[i / k]
m) Time Available for Road Traffic per Cycle (s)	541.6	[l - j]
n) Gate Closing Time (s)	15	
o) Green Time for Signal (s)	526.6	[m - n]

		GUELP	H TRANSPORTA	TION STUDY - CARG	O AND PASSENG	ER TRAIN DATA				ı
Type of Train	Direction	Train Arrival Time at the enty point / platform	Date	Time	Period	Train Leaving Time at the exit point / Platform	Duration of train crossing (mm:ss	Duration of train crossing (seconds)	No of train Cars	Estimated Train Speed (m/sec)
Cargo	EB	2-27-2021 2:47:48 AM	2-27-2021	2:47:48 AM	AM	2-27-2021 2:54:05 AM	6m 17s	377.00000012	114	8.20
Passenger	EB	2-27-2021 9:51:31 AM	2-27-2021	9:51:31 AM	AM	2-27-2021 9:51:39 AM	0m 8s	7.99999998	6	20.34
Passenger	WB	2-27-2021 6:57:15 PM	2-27-2021	6:57:15 PM	PM	2-27-2021 6:57:22 PM	0m 7s	6.99999975	6	23.25
Cargo	WB	2-27-2021 11:20:05 PM	2-27-2021 2-28-2021	11:20:05 PM 12:54:00 AM	PM AM	2-27-2021 11:20:58 PM 2-28-2021 12:54:42 AM	0m 53s	52.99999982 42.0000039	46	23.54 19.37
Cargo Passenger	FB FB	2-28-2021 12:54:00 AM 2-28-2021 9:58:32 AM	2-28-2021	9:58:32 AM	AM	2-28-2021 12:54:42 AM 2-28-2021 9:58:40 AM	0m 42s 0m 8s	7.99999998	30 6	20.34
Cargo	WB	2-28-2021 9:38:32 AW 2-28-2021 10:40:09 AM	2-28-2021	10:40:09 AM	AM	2-28-2021 9:38:40 AW 2-28-2021 10:40:16 AM	0m 7s	6.99999975	2	7.75
Cargo	EB	2-28-2021 4:12:33 PM	2-28-2021	4:12:33 PM	PM	2-28-2021 4:14:08 PM	1m 35s	95.00000020	16	4.57
Passenger	WB	2-28-2021 7:02:05 PM	2-28-2021	7:02:05 PM	PM	2-28-2021 7:02:12 PM	0m 7s	6.99999975	6	23.25
Cargo	WB	3-1-2021 1:13:27 AM	3-1-2021	1:13:27 AM	AM	3-1-2021 1:14:35 AM	1m 8s	68.0000018	49	19.54
Cargo	EB	3-1-2021 3:36:54 AM	3-1-2021	3:36:54 AM	AM	3-1-2021 3:39:37 AM	2m 43s	162.99999976	43	7.15
Passenger	EB	3-1-2021 5:51:56 AM	3-1-2021	5:51:56 AM	AM	3-1-2021 5:52:06 AM	0m 10s	9.99999982	6	16.27
Passenger	EB	3-1-2021 6:52:08 AM	3-1-2021	6:52:08 AM	AM	3-1-2021 6:52:21 AM	0m 13s	12.99999990	7	14.60
Passenger	EB	3-1-2021 7:52:26 AM	3-1-2021	7:52:26 AM	AM	3-1-2021 7:52:36 AM	0m 10s	10.00000045	7	18.98
Passenger	EB	3-1-2021 10:07:26 AM	3-1-2021	10:07:26 AM	AM	3-1-2021 10:07:40 AM	0m 14s	14.00000013	6	11.62
Cargo Passenger	WB	3-1-2021 3:05:52 PM 3-1-2021 5:13:32 PM	3-1-2021 3-1-2021	3:05:52 PM 5:13:32 PM	PM PM	3-1-2021 3:12:52 PM 3-1-2021 5:13:40 PM	7m 0s 0m 8s	420.0000011 7.9999998	24 7	1.55 23.73
Passenger	WB WB	3-1-2021 5:13:32 PM 3-1-2021 6:12:54 PM	3-1-2021	5:13:32 PM 6:12:54 PM	PM PM	3-1-2021 5:13:40 PM 3-1-2021 6:13:02 PM	0m 8s	7.99999998	7	23.73
Passenger	WB	3-1-2021 0:12:34 PM	3-1-2021	6:58:13 PM	PM	3-1-2021 6:13:02 PM	0m 7s	7.00000038	6	23.75
Passenger	WB	3-1-2021 7:13:37 PM	3-1-2021	7:13:37 PM	PM	3-1-2021 7:13:46 PM	0m 9s	8.99999959	7	21.09
Passenger	EB	3-2-2021 5:52:56 AM	3-2-2021	5:52:56 AM	AM	3-2-2021 5:53:14 AM	0m 18s	17.99999981	7	10.55
Passenger	EB	3-2-2021 6:52:17 AM	3-2-2021	6:52:17 AM	AM	3-2-2021 6:52:30 AM	0m 13s	12.99999990	7	14.60
Passenger	EB	3-2-2021 7:52:27 AM	3-2-2021	7:52:27 AM	AM	3-2-2021 7:52:37 AM	0m 10s	9.99999982	7	18.98
Cargo	EB	3-2-2021 9:27:59 AM	3-2-2021	9:27:59 AM	AM	3-2-2021 9:28:23 AM	0m 24s	23.9999995	9	10.17
Passenger	EB	3-2-2021 9:52:11 AM	3-2-2021	9:52:11 AM	AM	3-2-2021 9:52:22 AM	0m 11s	11.00000006	6	14.79
Cargo	WB WB	3-2-2021 11:25:32 AM	3-2-2021	11:25:32 AM 5:12:54 PM	AM PM	3-2-2021 11:25:55 AM 3-2-2021 5:13:02 PM	0m 23s	22.9999972 7.9999998		9.43
Passenger	WB	3-2-2021 5:12:54 PM 3-2-2021 6:13:42 PM	3-2-2021 3-2-2021	5:12:54 PM 6:13:42 PM	PM PM	3-2-2021 5:13:02 PM 3-2-2021 6:13:52 PM	0m 8s 0m 10s	10.0000045	7	23.73 18.98
Passenger Passenger	WB	3-2-2021 6:15:42 PW 3-2-2021 6:57:07 PM	3-2-2021	6:13:42 PM 6:57:07 PM	PM	3-2-2021 6:13:32 PM 3-2-2021 6:57:17 PM	0m 10s	9.99999982	6	16.27
Passenger	WB	3-2-2021 7:13:05 PM	3-2-2021	7:13:05 PM	PM	3-2-2021 7:13:13 PM	0m 8s	7.99999998	7	23.73
Cargo	WB	3-3-2021 12:10:13 AM	3-3-2021	12:10:13 AM	AM	3-3-2021 12:12:30 AM	2m 17s	136.99999996	70	13.86
Cargo	EB	3-3-2021 3:29:47 AM	3-3-2021	3:29:47 AM	AM	3-3-2021 3:35:23 AM	5m 36s	335.99999996	84	6.78
Passenger	EB	3-3-2021 5:52:43 AM	3-3-2021	5:52:43 AM	AM	3-3-2021 5:53:00 AM	0m 17s	17.00000020	7	11.17
Passenger	EB	3-3-2021 6:52:05 AM	3-3-2021	6:52:05 AM	AM	3-3-2021 6:52:18 AM	0m 13s	12.99999990	7	14.60
Passenger	EB	3-3-2021 7:52:38 AM	3-3-2021	7:52:38 AM	AM	3-3-2021 7:52:48 AM	0m 10s	9.99999982	7	18.98
Passenger	EB WR	3-3-2021 9:45:13 AM	3-3-2021	9:45:13 AM	AM AM	3-3-2021 9:45:21 AM	0m 8s	7.99999998	6	20.34
Cargo Cargo	FR FR	3-3-2021 9:53:24 AM 3-3-2021 11:39:12 AM	3-3-2021 3-3-2021	9:53:24 AM 11:39:12 AM	AM AM	3-3-2021 9:58:07 AM 3-3-2021 11:40:24 AM	4m 43s 1m 12s	282.99999952 71.99999986	12 24	1.15 9.04
Passenger	WR	3-3-2021 11:39:12 AWI	3-3-2021	5:12:17 PM	PM	3-3-2021 11:40:24 AM 3-3-2021 5:12:25 PM	0m 8s	7.9999998	7	23.73
Passenger	WB	3-3-2021 5:12:17 PM	3-3-2021	6:13:40 PM	PM	3-3-2021 5:12:25 PM 3-3-2021 6:13:50 PM	0m 10s	9.99999982	7	18.98
Passenger	WB	3-3-2021 6:54:52 PM	3-3-2021	6:54:52 PM	PM	3-3-2021 6:54:58 PM	0m 6s	6.00000015	6	27.12
Passenger	WB	3-3-2021 7:13:34 PM	3-3-2021	7:13:34 PM	PM	3-3-2021 7:13:43 PM	0m 9s	8.99999959	7	21.09
Cargo	WB	3-3-2021 11:04:31 PM	3-3-2021	11:04:31 PM	PM	3-3-2021 11:04:56 PM	0m 25s	25.00000019	18	19.53
Cargo	EB	3-4-2021 1:39:51 AM	3-4-2021	1:39:51 AM	AM	3-4-2021 1:41:51 AM	2m 0s	120.00000039	34	7.68
Passenger	EB	3-4-2021 5:53:10 AM	3-4-2021	5:53:10 AM	AM	3-4-2021 5:53:25 AM	0m 15s	15.00000036	7	12.66
Passenger	EB	3-4-2021 6:51:44 AM	3-4-2021	6:51:44 AM	AM	3-4-2021 6:51:58 AM	0m 14s	14.00000013	7	13.56
Passenger	EB	3-4-2021 7:52:12 AM	3-4-2021	7:52:12 AM	AM AM	3-4-2021 7:52:21 AM	0m 9s	8.99999959	7	21.09
Cargo Passenger	EB EB	3-4-2021 8:45:34 AM 3-4-2021 9:45:51 AM	3-4-2021 3-4-2021	8:45:34 AM 9:45:51 AM	AM AM	3-4-2021 8:45:59 AM 3-4-2021 9:46:00 AM	Om 25s Om 9s	25.0000019 9.0000022	17 6	18.44 18.08
Careo	WB	3-4-2021 9:45:51 AM 3-4-2021 10:58:56 AM	3-4-2021	9:45:51 AM 10:58:56 AM	AM	3-4-2021 9:46:00 AM 3-4-2021 10:59:21 AM	0m 9s 0m 25s	25.00000022	9	9.76
Passenger	WB	3-4-2021 10:38:36 AM 3-4-2021 5:12:41 PM	3-4-2021	5:12:41 PM	PM	3-4-2021 5:12:49 PM	0m 8s	7.9999998	7	23.73
Passenger	WB	3-4-2021 6:13:42 PM	3-4-2021	6:13:42 PM	PM	3-4-2021 6:13:50 PM	Om 8s	7.9999998	7	23.73
Cargo	WB	3-4-2021 6:57:53 PM	3-4-2021	6:57:53 PM	PM	3-4-2021 6:58:00 PM	0m 7s	6.99999975	6	23.25
Passenger	WB	3-4-2021 7:15:35 PM	3-4-2021	7:15:35 PM	PM	3-4-2021 7:15:43 PM	0m 8s	7.99999998	7	23.73
Cargo	WB	3-5-2021 12:26:07 AM	3-5-2021	12:26:07 AM	AM	3-5-2021 12:28:26 AM	2m 19s	139.00000043	70	13.66
Cargo	EB	3-5-2021 4:07:39 AM	3-5-2021	4:07:39 AM	AM	3-5-2021 4:47:53 AM	40m 14s	2413.99999978	103	1.16
Passenger	EB	3-5-2021 5:52:36 AM	3-5-2021	5:52:36 AM	AM	3-5-2021 5:52:50 AM	0m 14s	14.0000013	7	13.56
Passenger	EB CD	3-5-2021 6:51:35 AM	3-5-2021	6:51:35 AM	AM	3-5-2021 6:51:43 AM	0m 8s	7.99999998	7	23.73
Passenger Passenger	CO CO	3-5-2021 7:52:03 AM 3-5-2021 10:41:56 AM	3-5-2021 3-5-2021	7:52:03 AM 10:41:56 AM	AM AM	3-5-2021 7:52:12 AM 3-5-2021 10:42:05 AM	0m 9s 0m 9s	9.00000022 8.99999959	- 7 6	21.09 18.08
Passenger Cargo	ER ER	3-5-2021 10:41:56 AM 3-5-2021 2:19:04 PM	3-5-2021 3-5-2021	10:41:56 AM 2:19:04 PM	AM PM	3-5-2021 10:42:05 AM 3-5-2021 2:20:39 PM	0m 9s 1m 35s	8.99999959 95.00000020	2	18.08 0.57
Cargo	WR	3-5-2021 2:19:04 PM 3-5-2021 2:46:55 PM	3-5-2021	2:46:55 PM	PM	3-5-2021 2:20:39 PM 3-5-2021 2:58:33 PM	11m 38s	697.99999972	28	1.09
Passenger	WB	3-5-2021 2:46:55 PW 3-5-2021 5:11:44 PM	3-5-2021	5:11:44 PM	PM	3-5-2021 2:38:33 PW 3-5-2021 5:11:52 PM	0m 8s	7.9999998	7	23.73
Passenger	WB	3-5-2021 6:12:34 PM	3-5-2021	6:12:34 PM	PM	3-5-2021 6:12:42 PM	0m 8s	7.99999998	7	23.73
Passenger	WB	3-5-2021 6:57:47 PM	3-5-2021	6:57:47 PM	PM	3-5-2021 6:57:54 PM	0m 7s	6.9999975	6	23.25
Passenger	WB	3-5-2021 7:14:38 PM	3-5-2021	7:14:38 PM	PM	3-5-2021 7:14:47 PM	0m 9s	9.00000022	7	21.09
Passenger	WB	3-5-2021 10:27:21 PM	3-5-2021	10:27:21 PM	PM	3-5-2021 10:28:03 PM	0m 42s	42.00000039	38	24.54
			1							L

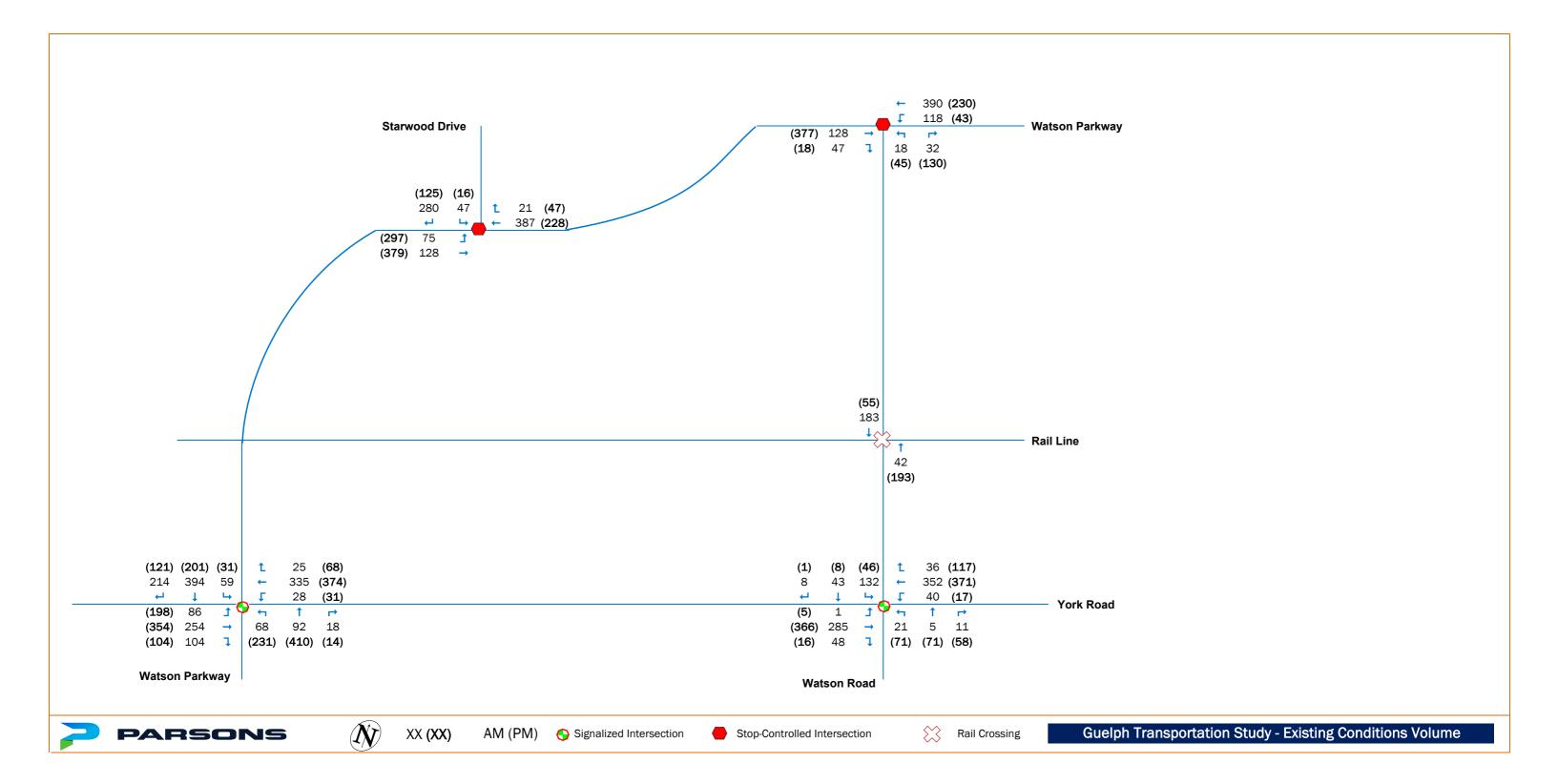
AM PEAK HO	OUR	PM PEAK HOUR					
Peak Hour:	8:00 - 9:15	Peak Hour:	16:15-17:30				
Eastbound Direction		Eastbound Direction					
Total Cargo Trains	1	Total Cargo Trains	1				
Trains Per day	1	Trains Per day	1				
Train Cars	17	Train Cars	16				
Equivalent Passenger (GO) Trains	2	Equivalent Passenger (GO) Trains	2				
Westbound Direction		Westbound Direction					
Total Trains	0	Total Trains	0				

ASSUMPTIONS
Average Passenger Train Speed: 19.72 km/h
Rounded up to: 20 km/h



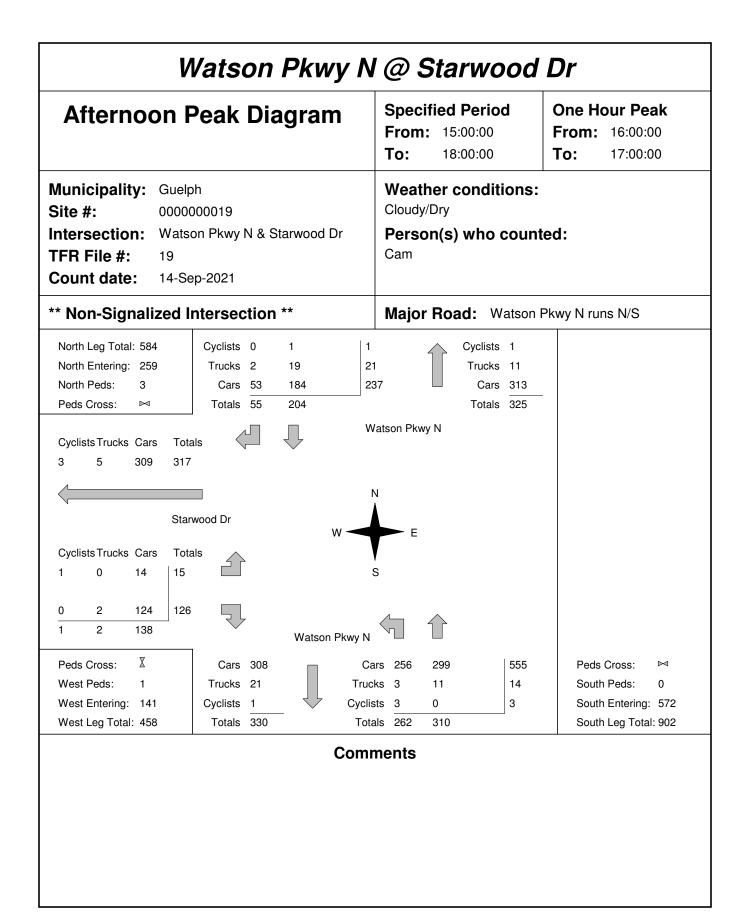
**APPENDIX E** 

TURNING MOVEMENT COUNT DATA (STUDY AREA B)



#### Watson Pkwy N @ Starwood Dr **Specified Period Morning Peak Diagram One Hour Peak** From: 8:00:00 **From:** 7:00:00 To: 9:30:00 To: 9:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000019 Intersection: Watson Pkwy N & Starwood Dr Person(s) who counted: Cam TFR File #: 19 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Watson Pkwy N runs N/S Cyclists 1 North Leg Total: 390 2 Cyclists 1 North Entering: 257 Trucks 3 24 21 Trucks 20 North Peds: Cars 26 205 231 Cars 112 Peds Cross: Totals 30 227 Totals 133 $\bowtie$ Watson Pkwy N Totals Cyclists Trucks Cars 5 104 110 Starwood Dr Cyclists Trucks Cars Totals 3 31 34 215 217 1 246 Watson Pkwy N $\mathbb{X}$ Peds Cross: Peds Cross: Cars 420 Cars 78 159 $\bowtie$ West Peds: 0 Trucks 22 Trucks 2 17 19 South Peds: 0 West Entering: 251 Cyclists 2 Cyclists 0 South Entering: 179 1 West Leg Total: 361 Totals 80 South Leg Total: 623 Totals 444 **Comments**

#### Watson Pkwy N @ Starwood Dr **Specified Period Mid-day Peak Diagram One Hour Peak** From: 12:00:00 From: 11:00:00 To: 13:30:00 To: 13:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000019 Intersection: Watson Pkwy N & Starwood Dr Person(s) who counted: Cam TFR File #: 19 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Watson Pkwy N runs N/S Cyclists 0 0 North Leg Total: 332 Cyclists 1 North Entering: 157 Trucks 5 18 13 Trucks 18 North Peds: Cars 13 126 139 Cars 156 Peds Cross: Totals 18 139 Totals 175 $\bowtie$ Watson Pkwy N Totals Cyclists Trucks Cars 6 127 133 Starwood Dr Cyclists Trucks Cars Totals 2 14 16 108 109 0 1 122 Watson Pkwy N $\mathbb{X}$ Peds Cross: Peds Cross: Cars 234 Cars 114 142 256 $\bowtie$ West Peds: 1 Trucks 14 Trucks 1 16 17 South Peds: 0 West Entering: 125 Cyclists 0 Cyclists 0 South Entering: 274 1 West Leg Total: 258 Totals 115 South Leg Total: 522 Totals 248 **Comments**



# Watson Pkwy N @ Starwood Dr

# **Total Count Diagram**

Municipality: Guelph

Site #: 000000019

Intersection: Watson Pkwy N & Starwood Dr

TFR File #: 19

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

Watson Pkwy N

# \*\* Non-Signalized Intersection \*\*

Major Road: Watson Pkwy N runs N/S

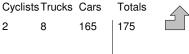
Cars 1428

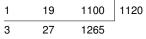
Cyclists 1 10 North Leg Total: 3202 Cyclists 7 North Entering: 1659 133 Trucks 108 Trucks 25 108 North Peds: Cars 199 1317 1516 Totals 225 Peds Cross: 1434 Totals 1543

Cyclists Trucks Cars Totals 39 1259 1303



Starwood Dr





 $\mathbb{X}$ Peds Cross: West Peds: 7 West Entering: 1295 West Leg Total: 2598

Cars 2417 Trucks 127 Cyclists 10 Totals 2554





Cars 1060 1263 2323 Trucks 14 100 114 9 Cyclists 4 Totals 1078 1368

Peds Cross:  $\bowtie$ South Peds: 0 South Entering: 2446 South Leg Total: 5000

### **Comments**

#### Watson Pkwy @ York Rd **Morning Peak Diagram Specified Period One Hour Peak** From: 7:00:00 **From:** 7:45:00 To: 9:30:00 To: 8:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000020 Intersection: York Rd & Watson Pkwy Person(s) who counted: Cam TFR File #: 20 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: York Rd runs W/E North Leg Total: 618 Cyclists 0 0 3 Cyclists 1 East Leg Total: 598 North Entering: 454 Trucks 4 4 22 East Entering: 14 Trucks 17 300 East Peds: North Peds: Cars 133 238 58 429 Cars 146 1 $\mathbb{X}$ Totals 164 Peds Cross: Totals 137 255 62 Peds Cross: $\bowtie$ Watson Pkwy N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 29 421 450 2 0 20 240 21 0 261 11 0 19 York Rd 269 0 Cyclists Trucks Cars Totals York Rd 7 42 49 1 16 199 216 69 78 Trucks Cyclists Totals 0 9 Cars 32 310 276 298 Watson Pkwy S $\mathbb{X}$ Peds Cross: Cars 318 Peds Cross: $\bowtie$ Cars 48 19 153 West Peds: 0 Trucks 31 Trucks 4 1 13 South Peds: 0 8 West Entering: 343 Cyclists 3 Cyclists 0 1 South Entering: 167 0 West Leg Total: 793 Totals 52 South Leg Total: 519 Totals 352 **Comments**

#### Watson Pkwy @ York Rd Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000020 Intersection: York Rd & Watson Pkwy Person(s) who counted: Cam TFR File #: 20 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: York Rd runs W/E North Leg Total: 506 Cyclists 0 0 0 Cyclists 2 East Leg Total: 561 Trucks 4 11 East Entering: North Entering: 238 1 Trucks 12 296 East Peds: North Peds: 0 Cars 78 119 30 227 Cars 254 0 $\mathbb{X}$ Totals 268 Peds Cross: Totals 82 125 31 Peds Cross: $\bowtie$ Watson Pkwy N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 24 369 394 0 25 233 11 1 245 23 0 26 York Rd 280 Cyclists Trucks Cars Totals York Rd 5 81 87 12 205 217 13 55 68 Trucks Cyclists Totals 0 Cars 30 341 249 16 0 265 Watson Pkwy S $\mathbb{X}$ Peds Cross: 221 Peds Cross: $\bowtie$ Cars 197 Cars 58 149 14 West Peds: 1 Trucks 22 Trucks 9 3 18 South Peds: 2 West Entering: 372 Cyclists 0 1 South Entering: 240 Cyclists 0 0 West Leg Total: 766 Totals 67 South Leg Total: 459 Totals 219 **Comments**

#### Watson Pkwy @ York Rd **Specified Period Afternoon Peak Diagram One Hour Peak** From: 15:00:00 **From:** 16:00:00 To: 18:00:00 To: 17:00:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000020 Intersection: York Rd & Watson Pkwy Person(s) who counted: Cam TFR File #: 20 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: York Rd runs W/E 0 North Leg Total: 898 Cyclists 0 0 Cyclists 3 East Leg Total: 757 Trucks 8 1 23 East Entering: North Entering: 326 14 Trucks 17 442 East Peds: North Peds: Cars 100 181 22 303 Cars 552 1 $\mathbb{X}$ Peds Cross: Totals 108 195 23 Totals 572 Peds Cross: $\bowtie$ Watson Pkwy N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 32 578 615 2 85 320 334 11 3 17 0 23 York Rd 419 5 Cyclists Trucks Cars Totals York Rd 5 161 166 20 253 273 2 57 59 Trucks Cyclists Totals 0 Cars 0 27 471 288 315 Watson Pkwy S $\mathbb{X}$ Peds Cross: Cars 255 480 Peds Cross: $\bowtie$ Cars 158 309 13 West Peds: 0 Trucks 22 Trucks 13 11 6 30 South Peds: 1 West Entering: 498 Cyclists 0 Cyclists 2 3 South Entering: 513 0 West Leg Total: 1113 Totals 277 Totals 173 South Leg Total: 790 **Comments**

# Watson Pkwy @ York Rd

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000020

Intersection: York Rd & Watson Pkwy

TFR File #: 20

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

## \*\* Signalized Intersection \*\*

North Entering: 2544 North Peds:

North Leg Total: 5005

Peds Cross:  $\bowtie$ 

8 Cyclists 3 0 124 Trucks 40 70 14 Cars 785 1343 284 Totals 828 1418

2412

Cyclists 9 Trucks 119 Cars 2333

Totals 2461

Major Road: York Rd runs W/E

East Leg Total: 4625 East Entering: 2388 East Peds: 2  $\mathbb{X}$ Peds Cross:

Cyclists Trucks Cars Totals 206 3238 3456







298

Watson Pkwy N



Trucks Cyclists Totals Cars 290 12 2 304 1804 99 5 1908 134 42 0 176

153

York Rd

C	Cyclists	Trucks	Cars	Total
1		38	710	749
4		119	1684	1807
0	)	63	508	571
5	;	220	2902	





York Rd

2085



 $\mathbb{X}$ Peds Cross: West Peds: 4

West Entering: 3127 West Leg Total: 6583

Cars 1985 Trucks 175 Cyclists 5 Totals 2165 Watson Pkwy S

Cars 649 Trucks 67 Cyclists 4

29 165 69 0 10 Totals 720 1408

1333

103

Trucks Cyclists Totals Cars 2071 162 2237

> Peds Cross:  $\bowtie$ South Peds: South Entering: 2260 South Leg Total: 4425

### **Comments**

#### Watson Rd N @ Watson Pkwy N **Specified Period One Hour Peak Morning Peak Diagram** From: 8:15:00 **From:** 7:00:00 To: 9:30:00 To: 9:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000017 Intersection: Watson Pkwy N & Watson Rd N Person(s) who counted: Cam TFR File #: 17 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Watson Pkwy N runs N/S North Leg Total: 454 Cyclists 0 1 Cyclists 1 East Leg Total: 134 26 North Entering: 301 Trucks 25 1 Trucks 22 East Entering: East Peds: North Peds: 2 Cars 215 59 274 Cars 130 8 $\mathbb{X}$ Totals 153 Peds Cross: 241 60 Peds Cross: Totals Watson Pkwy N Trucks Cyclists Totals Cars 29 0 32 18 Watson Rd N Trucks Cyclists Totals Cars 0 83 84 Watson Pkwy N Peds Cross: $\bowtie$ Cars 232 Cars 101 24 125 Trucks 25 Trucks 19 0 19 South Peds: 0 Cyclists 2 0 1 South Entering: 145 Cyclists 1 Totals South Leg Total: 404 Totals 259 **Comments**

#### Watson Rd N @ Watson Pkwy N **Specified Period One Hour Peak** Mid-day Peak Diagram From: 11:00:00 **From:** 12:15:00 To: 13:30:00 To: 13:15:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000017 Intersection: Watson Pkwy N & Watson Rd N Person(s) who counted: Cam TFR File #: 17 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Watson Pkwy N runs N/S 0 North Leg Total: 406 Cyclists 0 Cyclists 0 East Leg Total: 122 21 2 East Entering: North Entering: 195 Trucks 19 Trucks 18 East Peds: North Peds: 3 Cars 136 38 174 Cars 193 3 $\mathbb{X}$ Totals 211 Peds Cross: 155 40 Peds Cross: Totals Watson Pkwy N Trucks Cyclists Totals Cars 52 0 55 12 Watson Rd N Trucks Cyclists Totals Cars 51 Watson Pkwy N Peds Cross: $\bowtie$ Cars 147 Cars 141 13 154 Trucks 20 Trucks 15 1 16 South Peds: 1 Cyclists 0 0 1 South Entering: 171 Cyclists 1 Totals South Leg Total: 338 Totals 167 **Comments**

#### Watson Rd N @ Watson Pkwy N **Specified Period One Hour Peak Afternoon Peak Diagram** From: 15:00:00 **From:** 16:15:00 17:15:00 To: 18:00:00 To: Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000017 Intersection: Watson Pkwy N & Watson Rd N Person(s) who counted: Cam TFR File #: 17 Count date: 14-Sep-2021 \*\* Non-Signalized Intersection \*\* Major Road: Watson Pkwy N runs N/S North Leg Total: 685 Cyclists 0 Cyclists 0 East Leg Total: 217 2 20 East Entering: North Entering: 258 Trucks 18 Trucks 13 156 East Peds: North Peds: Cars 196 41 237 Cars 414 6 $\mathbb{X}$ Peds Cross: 215 43 Totals 427 Peds Cross: Totals Watson Pkwy N Trucks Cyclists Totals Cars 0 116 40 40 156 Watson Rd N Trucks Cyclists Totals Cars 59 0 61 Watson Pkwy N Peds Cross: $\bowtie$ Cars 236 Cars 298 18 316 Trucks 18 Trucks 13 0 13 South Peds: 0 0 0 0 South Entering: 329 Cyclists 1 Cyclists Totals South Leg Total: 584 Totals 255 **Comments**

# Watson Rd N @ Watson Pkwy N

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000017

Intersection: Watson Pkwy N & Watson Rd N

TFR File #: 17

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

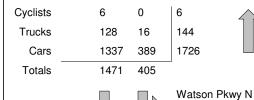
Person(s) who counted:

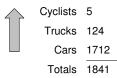
Cam

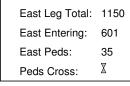
## \*\* Non-Signalized Intersection \*\*

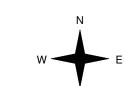
### Major Road: Watson Pkwy N runs N/S

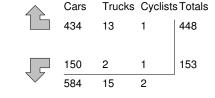
North Leg Total: 3717 North Entering: 1876 North Peds: 15 Peds Cross:











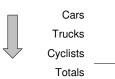


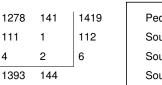












Peds Cross:  $\bowtie$ South Peds: 2 South Entering: 1537 South Leg Total: 3161

549

### **Comments**

#### Watson Rd @ York Rd **Specified Period Morning Peak Diagram One Hour Peak** From: 7:45:00 From: 7:00:00 To: 9:30:00 To: 8:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000018 Intersection: York Rd & Watson Rd Person(s) who counted: Cam TFR File #: 18 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: York Rd runs W/E North Leg Total: 153 Cyclists 0 0 0 Cyclists 0 East Leg Total: 617 2 North Entering: 115 East Entering: Trucks 1 0 Trucks 4 312 East Peds: North Peds: Cars 6 39 68 113 Cars 34 0 $\mathbb{X}$ Totals 7 Peds Cross: 40 68 Totals 38 Peds Cross: $\bowtie$ Watson Rd N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 27 260 287 20 2 0 22 238 22 0 260 25 0 30 York Rd 283 0 Cyclists Trucks Cars Totals York Rd 0 0 2 2 17 201 218 2 35 37 Trucks Cyclists Totals 0 Cars 0 19 238 281 24 305 Watson Rd S $\mathbb{X}$ Peds Cross: 40 Peds Cross: $\bowtie$ Cars 99 Cars 16 12 West Peds: 0 Trucks 8 Trucks 4 2 7 13 South Peds: 0 West Entering: 257 Cyclists 0 Cyclists 0 0 South Entering: 53 0 West Leg Total: 544 Totals 20 South Leg Total: 160 Totals 107 **Comments**

#### Watson Rd @ York Rd Mid-day Peak Diagram **Specified Period One Hour Peak** From: 11:00:00 **From:** 11:45:00 To: 13:30:00 To: 12:45:00 Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000018 Intersection: York Rd & Watson Rd Person(s) who counted: Cam TFR File #: 18 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: York Rd runs W/E North Leg Total: 105 Cyclists 0 0 0 Cyclists 0 East Leg Total: 529 North Entering: 48 Trucks 0 1 3 Trucks 3 East Entering: 2 265 North Peds: East Peds: Cars 6 15 24 45 Cars 54 0 $\mathbb{X}$ 17 Peds Cross: Totals 6 25 Totals 57 Peds Cross: ⋈ Watson Rd N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 15 245 261 28 1 0 29 197 12 1 210 20 0 26 York Rd 245 Cyclists Trucks Cars Totals York Rd 0 0 2 2 11 203 214 5 22 27 Trucks Cyclists Totals 0 Cars 244 0 16 227 20 264 Watson Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 57 Cars 42 17 83 West Peds: 0 Trucks 13 Trucks 3 2 8 13 South Peds: 0 West Entering: 243 Cyclists 0 Cyclists 0 0 0 South Entering: 96 West Leg Total: 504 Totals 70 Totals 45 South Leg Total: 166 **Comments**

#### Watson Rd @ York Rd **Afternoon Peak Diagram Specified Period One Hour Peak** From: 15:00:00 **From:** 16:00:00 17:00:00 To: 18:00:00 To: Municipality: Guelph Weather conditions: Cloudy/Dry Site #: 000000018 Intersection: York Rd & Watson Rd Person(s) who counted: Cam TFR File #: 18 Count date: 14-Sep-2021 \*\* Signalized Intersection \*\* Major Road: York Rd runs W/E North Leg Total: 205 Cyclists 1 0 Cyclists 0 East Leg Total: 793 North Entering: 49 Trucks 0 2 0 2 East Entering: Trucks 0 420 North Peds: East Peds: Cars 5 32 46 Cars 156 0 $\mathbb{X}$ Totals 156 Peds Cross: Totals 6 11 32 Peds Cross: ⋈ Watson Rd N Totals Trucks Cyclists Totals Cyclists Trucks Cars Cars 20 366 390 0 0 85 295 315 18 2 17 0 20 York Rd 397 2 21 Cyclists Trucks Cars Totals York Rd 0 0 4 4 25 258 283 16 19 Trucks Cyclists Totals 0 3 Cars 0 28 278 347 26 373 Watson Rd S $\mathbb{X}$ Peds Cross: Peds Cross: $\bowtie$ Cars 42 Cars 66 57 190 West Peds: 1 Trucks 8 Trucks 2 1 3 South Peds: 0 0 West Entering: 306 Cyclists 0 1 South Entering: 194 Cyclists 1 0 West Leg Total: 696 Totals 69 South Leg Total: 244 Totals 50 **Comments**

# Watson Rd @ York Rd

## **Total Count Diagram**

Municipality: Guelph

Site #: 000000018

Intersection: York Rd & Watson Rd

TFR File #: 18

North Leg Total: 1100

North Entering: 529

North Peds:

Peds Cross:

1

0

Peds Cross:

West Peds:

West Entering: 2083

West Leg Total: 4289

Count date: 14-Sep-2021 Weather conditions:

Cloudy/Dry

Person(s) who counted:

Cam

### \*\* Signalized Intersection \*\*

Cyclists 1 0

Trucks 3 5 16 Cars 43 140 329 512

Totals 47 148 334

Major Road: York Rd runs W/E

Cyclists 5 Trucks 13 Cars 553

Totals 571

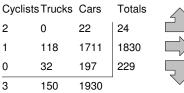
East Leg Total: 4833 East Entering: 2438 East Peds: 1  $\mathbb{X}$ Peds Cross:

Cyclists Trucks Cars Totals 147 2053 2206

 $\bowtie$ 



York Rd



 $\mathbb{X}$ 

1



Cars 497

Trucks 82

Totals 579

Cyclists 0

Watson Rd S



Watson Rd N

618

Trucks Cyclists Totals Cars 334 5 0 339 1772 121 4 1897 160 42 0 202 2266 168

York Rd

Cars 238 197 183

> Trucks 23 48 79 8 3 4 Cyclists 1 0 Totals 262 231

Trucks Cyclists Totals Cars 2223 171 2395

> Peds Cross:  $\bowtie$ South Peds: 3 South Entering: 701 South Leg Total: 1280

### **Comments**



**APPENDIX F** 

SYNCHRO REPORTS (STUDY AREA B)

Existing Conditions - Study Area B, AM Peak Hour

	۶	<b>→</b>	*	•	+	•	1	<b>†</b>	~	/	ţ	1
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ર્ન	7		र्भ	7		र्स	7		र्स	<b>*</b> 8
Traffic Volume (vph)	1	285	48	40	352	36	21	5	11	132	43	8
Future Volume (vph)	1	285	48	40	352	36	21	5	11	132	43	8
Lane Group Flow (vph)	0	311	52	0	426	39	0	28	12	0	190	9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			2			8			4	
Permitted Phases	2		2	2		2	8		8	4		4
Detector Phase	2	2	2	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	17.0	17.0	17.0	17.0	17.0	17.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None	None	None	None	None
v/c Ratio		0.30	0.06		0.44	0.04		0.09	0.03		0.52	0.02
Control Delay		8.9	2.9		10.4	2.2		14.3	0.1		20.5	0.1
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0		0.6	0.0
Total Delay		8.9	2.9		10.4	2.2		14.3	0.1		21.1	0.1
Queue Length 50th (m)		13.1	0.0		19.9	0.0		1.4	0.0		10.7	0.0
Queue Length 95th (m)		33.6	4.1		50.1	2.8		6.8	0.0		31.7	0.0
Internal Link Dist (m)		379.2			158.4			148.1			15.9	
Turn Bay Length (m)			5.0			5.0			20.0			5.0
Base Capacity (vph)		1324	1121		1231	1152		538	747		629	747
Starvation Cap Reductn		0	0		0	0		0	0		199	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		0.23	0.05		0.35	0.03		0.05	0.02		0.44	0.01

## Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 44.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Watson Rd & York Rd



	۶	<b>→</b>	•	•	•	•	1	1	~	-	Ţ	4
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ન	7		र्स	7		र्स	7		र्स	<b>7</b> 8
Traffic Volume (vph)	1	285	48	40	352	36	21	5	11	132	43	
Future Volume (vph)	1	285	48	40	352	36	21	5	11	132	43	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		0.99	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)		1847	1541		1814	1585		1782	1633		1815	1633
Flt Permitted		1.00	1.00		0.94	1.00		0.66	1.00		0.76	1.00
Satd. Flow (perm)		1845	1541		1717	1585		1226	1633		1433	1633
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)	1	310	52	43	383	39	23	5	12	143	47	9
RTOR Reduction (vph)	0	0	25	0	0	19	0	0	9	0	0	7
Lane Group Flow (vph)	0	311	27	0	426	20	0	28	3	0	190	2
Heavy Vehicles (%)	0%	4%	6%	0%	6%	3%	0%	20%	0%	2%	2%	0%
	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			2			8			4	
Permitted Phases	2		2	2		2	8		8	4		4
Actuated Green, G (s)		24.0	24.0		24.0	24.0		9.7	9.7		9.7	9.7
Effective Green, g (s)		24.0	24.0		24.0	24.0		9.7	9.7		9.7	9.7
Actuated g/C Ratio		0.53	0.53		0.53	0.53		0.21	0.21		0.21	0.21
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		968	809		901	832		260	346		304	346
v/s Ratio Prot												
v/s Ratio Perm		0.17	0.02		c0.25	0.01		0.02	0.00		c0.13	0.00
v/c Ratio		0.32	0.03		0.47	0.02		0.11	0.01		0.62	0.01
Uniform Delay, d1		6.2	5.2		6.9	5.2		14.5	14.2		16.3	14.2
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.2	0.0		0.4	0.0		0.2	0.0		4.0	0.0
Delay (s)		6.4	5.3		7.2	5.2		14.7	14.2		20.3	14.2
Level of Service		Α	Α		Α	Α		В	В		С	В
Approach Delay (s)		6.2			7.1			14.5			20.0	
Approach LOS		Α			Α			В			С	
Intersection Summary												
HCM 2000 Control Delay			9.5	Н	CM 2000	Level of	Service		Α			
HCM 2000 Volume to Capacity	ratio		0.52									
Actuated Cycle Length (s)			45.7	S	um of lost	time (s)			12.0			
Intersection Capacity Utilization			67.0%		CU Level of				С			
Analysis Period (min)			15									
c Critical Lane Group												

	-	7	1	•	1	-
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	<b>†</b>	7	7	<b></b>	**	
Traffic Volume (veh/h)	128	47	118	390	18	32
Future Volume (Veh/h)	128	47	118	390	18	32
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	139	51	128	424	20	35
Pedestrians				2	8	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.1	1.1	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			198		827	149
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			198		827	149
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			91		94	96
cM capacity (veh/h)			1364		309	871
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	139	51	128	424	55	
Volume Left	0	0	128	0	20	
Volume Right	0	51	0	0	35	
cSH	1700	1700	1364	1700	525	
Volume to Capacity	0.08	0.03	0.09	0.25	0.10	
Queue Length 95th (m)	0.0	0.0	2.4	0.0	2.7	
Control Delay (s)	0.0	0.0	7.9	0.0	12.7	
Lane LOS			Α		В	
Approach Delay (s)	0.0		1.8		12.7	
Approach LOS					В	
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utiliza	ation		31.2%	IC	U Level o	f Service
Analysis Period (min)			15	.0	2 201010	. 55, 1100
raidiyələ i Gilou (IIIII)			10			

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Y	<b>^</b>	<b>^</b>	7	7	7
Traffic Volume (veh/h)	75	128	387	21	47	280
Future Volume (Veh/h)	75	128	387	21	47	280
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	139	421	23	51	304
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	444				724	421
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	444				724	421
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				86	52
cM capacity (veh/h)	1111				366	632
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	82	139	421	23	51	304
Volume Left	82	0	0	0	51	0
Volume Right	0	0	0	23	0	304
cSH	1111	1700	1700	1700	366	632
Volume to Capacity	0.07	0.08	0.25	0.01	0.14	0.48
Queue Length 95th (m)	1.8	0.0	0.0	0.0	3.6	19.8
Control Delay (s)	8.5	0.0	0.0	0.0	16.4	15.8
Lane LOS	Α				С	С
Approach Delay (s)	3.2		0.0		15.9	
Approach LOS					С	
Intersection Summary						
Average Delay			6.2			
Intersection Capacity Utilization	on		44.4%	IC	U Level c	of Service
Analysis Period (min)			15			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>↑</b>	7	*	<b>↑</b>	7	7	<b>↑</b>	7	*	<b>^</b>	7
Traffic Volume (vph)	86	254	104	28	335	25	68	92	18	59	394	214
Future Volume (vph)	86	254	104	28	335	25	68	92	18	59	394	214
Lane Group Flow (vph)	93	276	113	30	364	27	74	100	20	64	428	233
Turn Type	pm+pt	NA	Perm									
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	7.0	7.0	6.0	7.0	7.0
Minimum Split (s)	9.0	34.0	34.0	9.0	34.0	34.0	9.0	31.0	31.0	9.0	31.0	31.0
Total Split (s)	10.0	34.0	34.0	10.0	34.0	34.0	9.0	31.0	31.0	9.0	31.0	31.0
Total Split (%)	11.9%	40.5%	40.5%	11.9%	40.5%	40.5%	10.7%	36.9%	36.9%	10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	None	Min	Min									
v/c Ratio	0.24	0.43	0.18	0.06	0.68	0.05	0.23	0.17	0.04	0.11	0.74	0.36
Control Delay	13.7	21.6	5.0	11.9	30.5	0.2	14.3	20.6	0.2	12.9	32.7	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.7	21.6	5.0	11.9	30.5	0.2	14.3	20.6	0.2	12.9	32.7	5.2
Queue Length 50th (m)	7.4	26.4	0.0	2.3	46.5	0.0	5.4	10.1	0.0	4.6	52.5	0.0
Queue Length 95th (m)	15.5	55.6	9.7	6.5	75.1	0.0	14.3	23.4	0.0	12.7	#102.4	15.0
Internal Link Dist (m)		166.1			379.2			159.6			471.1	
Turn Bay Length (m)	25.0		5.0	25.0		35.0	20.0		5.0	55.0		65.0
Base Capacity (vph)	387	880	809	532	862	801	320	755	613	577	800	808
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.31	0.14	0.06	0.42	0.03	0.23	0.13	0.03	0.11	0.54	0.29

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 67.3

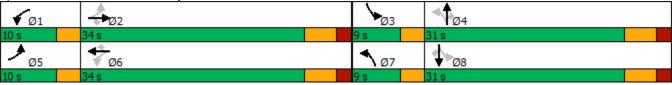
Natural Cycle: 85

Control Type: Actuated-Uncoordinated

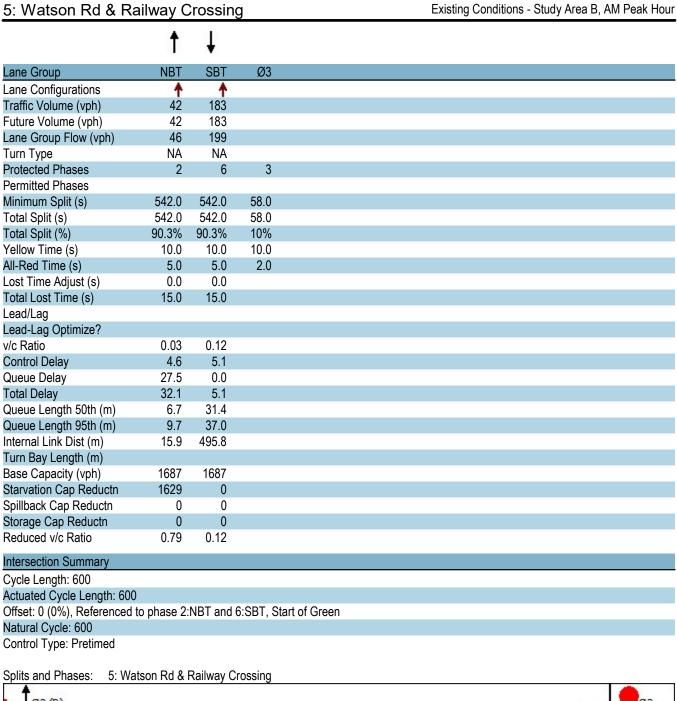
# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy & York Rd



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>↑</b>	7	7	<b>↑</b>	7	7	<b>^</b>	7	7	<b>↑</b>	7
Traffic Volume (vph)	86	254	104	28	335	25	68	92	18	59	394	214
Future Volume (vph)	86	254	104	28	335	25	68	92	18	59	394	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1847	1570	1755	1830	1570	1630	1762	1276	1738	1902	1601
Flt Permitted	0.34	1.00	1.00	0.59	1.00	1.00	0.28	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	596	1847	1570	1090	1830	1570	477	1762	1276	1267	1902	1601
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)	93	276	113	30	364	27	74	100	20	64	428	233
RTOR Reduction (vph)	0	0	74	0	0	19	0	0	14	0	0	162
Lane Group Flow (vph)	93	276	39	30	364	8	74	100	6	64	428	71
Heavy Vehicles (%)	8%	4%	4%	4%	5%	4%	12%	9%	28%	5%	1%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		<u> </u>	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		8
Actuated Green, G (s)	28.6	23.6	23.6	23.0	20.8	20.8	26.6	22.3	22.3	24.2	21.1	21.1
Effective Green, g (s)	28.6	23.6	23.6	23.0	20.8	20.8	26.6	22.3	22.3	24.2	21.1	21.1
Actuated g/C Ratio	0.41	0.34	0.34	0.33	0.30	0.30	0.38	0.32	0.32	0.35	0.30	0.30
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	325	629	535	383	550	471	255	567	411	464	579	488
v/s Ratio Prot	c0.02	0.15		0.00	c0.20		c0.02	0.06		0.01	c0.23	
v/s Ratio Perm	0.10		0.02	0.02		0.01	0.09		0.01	0.04		0.04
v/c Ratio	0.29	0.44	0.07	0.08	0.66	0.02	0.29	0.18	0.02	0.14	0.74	0.15
Uniform Delay, d1	13.3	17.7	15.4	15.7	21.1	17.0	14.6	16.9	16.0	15.2	21.6	17.5
Progression 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
Incremental Delay, d2	0.5	0.5	0.1	0.1	3.0	0.0	0.6	0.1	0.0	0.1	4.9	0.1
Delay (s)	13.7	18.2	15.5	15.8	24.1	17.0	15.2	17.0	16.0	15.3	26.5	17.6
Level of Service	В	В	В	В	С	В	В	В	В	В	С	В
Approach Delay (s)		16.7			23.1			16.2			22.7	
Approach LOS		В			С			В			С	
Intersection Summary												
HCM 2000 Control Delay			20.5	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capa	acity ratio		0.63									
Actuated Cycle Length (s)			69.2		um of los				18.0			
Intersection Capacity Utiliza	ation		65.0%	IC	CU Level	of Service	9		С			
Analysis Period (min)			15									
c Critical Lane Group												



Ø2 (R) Ø3 Ø6 (R)

exam-Study Area B.syn Synchro 10 Report 11/10/2021 Page 7

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>↑</b>			<b>↑</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	42	0	0	183	0
Future Volume (vph)	0	0	0	0	0	0	0	42	0	0	183	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
FIt Protected								1.00			1.00	
Satd. Flow (prot)								1921			1921	
FIt Permitted								1.00			1.00	
Satd. Flow (perm)								1921			1921	
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)	0	0	0	0	0	0	0	46	0	0	199	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	46	0	0	199	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1687			1687	
v/s Ratio Prot								0.02			c0.10	
v/s Ratio Perm												
v/c Ratio								0.03			0.12	
Uniform Delay, d1								4.5			5.0	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.0			0.1	
Delay (s)								4.6			5.1	
Level of Service								Α			Α	
Approach Delay (s)		0.0			0.0			4.6			5.1	
Approach LOS		Α			Α			Α			Α	
Intersection Summary												
HCM 2000 Control Delay			5.0	Н	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	y ratio		0.11									
Actuated Cycle Length (s)			600.0	Sı	um of lost	time (s)			27.0			
Intersection Capacity Utilizatio	n	-	451.7%			of Service			Н			
Analysis Period (min)			15									

c Critical Lane Group

Existing Conditions - Study Area B, PM Peak Hour

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		र्स	7		र्स	7		ની	7		र्स	7
Traffic Volume (vph)	5	366	16	17	371	117	71	71	58	46	8	1
Future Volume (vph)	5	366	16	17	371	117	71	71	58	46	8	1
Lane Group Flow (vph)	0	403	17	0	421	127	0	154	63	0	59	1
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			2			8			4	
Permitted Phases	2		2	2		2	8		8	4		4
Detector Phase	2	2	2	2	2	2	8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	17.0	17.0	17.0	17.0	17.0	17.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (%)	58.3%	58.3%	58.3%	58.3%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Total Lost Time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	Min	Min	Min	Min	Min	Min	None	None	None	None	None	None
v/c Ratio		0.38	0.02		0.41	0.13		0.46	0.15		0.20	0.00
Control Delay		8.8	0.2		9.2	4.7		20.0	6.0		16.1	0.0
Queue Delay		0.0	0.0		0.0	0.0		0.0	0.0		0.1	0.0
Total Delay		8.8	0.2		9.2	4.7		20.0	6.0		16.3	0.0
Queue Length 50th (m)		17.1	0.0		18.2	2.4		8.5	0.0		3.1	0.0
Queue Length 95th (m)		41.2	0.4		44.2	9.9		26.2	6.8		12.1	0.0
Internal Link Dist (m)		379.2			158.4			148.1			15.9	
Turn Bay Length (m)			5.0			5.0			20.0			5.0
Base Capacity (vph)		1343	1116		1295	1173		633	765		553	761
Starvation Cap Reductn		0	0		0	0		0	0		141	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		0.30	0.02		0.33	0.11		0.24	0.08		0.14	0.00

## Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 43.6

Natural Cycle: 60

Control Type: Actuated-Uncoordinated

Splits and Phases: 1: Watson Rd & York Rd



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ર્ન	7		ર્ન	7		ર્ન	7		ર્ન	7
Traffic Volume (vph)	5	366	16	17	371	117	71	71	58	46	8	1
Future Volume (vph)	5	366	16	17	371	117	71	71	58	46	8	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes		1.00	0.98		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	1.00
Frt		1.00	0.85		1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00		1.00	1.00		0.98	1.00		0.96	1.00
Satd. Flow (prot)		1847	1509		1813	1585		1704	1633		1807	1633
Flt Permitted		0.99	1.00		0.98	1.00		0.81	1.00		0.66	1.00
Satd. Flow (perm)		1838	1509		1774	1585		1417	1633		1235	1633
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	398	17	18	403	127	77	77	63	50	9	1
RTOR Reduction (vph)	0	0	8	0	0	27	0	0	51	0	0	1
Lane Group Flow (vph)	0	403	9	0	421	100	0	154	12	0	59	0
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	4%	6%	0%	6%	3%	0%	20%	0%	2%	2%	0%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			2			8			4	
Permitted Phases	2		2	2		2	8		8	4		4
Actuated Green, G (s)		24.0	24.0		24.0	24.0		8.7	8.7		8.7	8.7
Effective Green, g (s)		24.0	24.0		24.0	24.0		8.7	8.7		8.7	8.7
Actuated g/C Ratio		0.54	0.54		0.54	0.54		0.19	0.19		0.19	0.19
Clearance Time (s)		6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0
Vehicle Extension (s)		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		986	810		952	851		275	317		240	317
v/s Ratio Prot												
v/s Ratio Perm		0.22	0.01		c0.24	0.06		c0.11	0.01		0.05	0.00
v/c Ratio		0.41	0.01		0.44	0.12		0.56	0.04		0.25	0.00
Uniform Delay, d1		6.1	4.8		6.3	5.1		16.3	14.6		15.2	14.5
Progression Factor		1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	0.0		0.3	0.1		2.6	0.1		0.5	0.0
Delay (s)		6.4	4.8		6.6	5.2		18.9	14.7		15.8	14.5
Level of Service		Α	Α		Α	Α		В	В		В	В
Approach Delay (s)		6.4			6.3			17.6			15.7	
Approach LOS		Α			Α			В			В	
Intersection Summary												
HCM 2000 Control Delay			8.7	Н	CM 2000	Level of S	Service		Α			
HCM 2000 Volume to Capacity	y ratio		0.47									
Actuated Cycle Length (s)			44.7	S	um of lost	t time (s)			12.0			
Intersection Capacity Utilizatio	n		57.7%			of Service			В			
Analysis Period (min)			15									

c Critical Lane Group

	-	7	1	•	1	-
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	<b>†</b>	7	7	<b></b>	**	
Traffic Volume (veh/h)	377	18	43	230	45	130
Future Volume (Veh/h)	377	18	43	230	45	130
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	410	20	47	250	49	141
Pedestrians				1	6	
Lane Width (m)				3.7	3.7	
Walking Speed (m/s)				1.1	1.1	
Percent Blockage				0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			436		760	417
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			436		760	417
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.4
p0 queue free %			96		86	77
cM capacity (veh/h)			1117		359	617
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	410	20	47	250	190	
Volume Left	0	0	47	0	49	
Volume Right	0	20	0	0	141	
cSH	1700	1700	1117	1700	520	
Volume to Capacity	0.24	0.01	0.04	0.15	0.37	
Queue Length 95th (m)	0.0	0.0	1.0	0.0	12.6	
Control Delay (s)	0.0	0.0	8.4	0.0	15.8	
Lane LOS	3.0	0.3	A		C	
Approach Delay (s)	0.0		1.3		15.8	
Approach LOS	0.0				C	
Intersection Summary						
Average Delay			3.7			
Intersection Capacity Utiliza	ation		43.8%	IC	U Level o	f Sandice
	au011			IC	O Level 0	i Sei vice
Analysis Period (min)			15			

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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	*	<b>^</b>	<b>^</b>	7	*	7
Traffic Volume (veh/h)	297	379	228	47	16	125
Future Volume (Veh/h)	297	379	228	47	16	125
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	323	412	248	51	17	136
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	299				1306	248
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	299				1306	248
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	74				87	83
cM capacity (veh/h)	1256				132	791
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	323	412	248	51	17	136
Volume Left	323	0	0	0	17	0
Volume Right	0	0	0	51	0	136
cSH	1256	1700	1700	1700	132	791
Volume to Capacity	0.26	0.24	0.15	0.03	0.13	0.17
Queue Length 95th (m)	7.8	0.0	0.0	0.0	3.3	4.7
Control Delay (s)	8.9	0.0	0.0	0.0	36.2	10.5
Lane LOS	Α				Е	В
Approach Delay (s)	3.9		0.0		13.3	
Approach LOS					В	
Intersection Summary						
Average Delay			4.1			
Intersection Capacity Utiliz	ation		41.8%	IC	U Level o	of Service
Analysis Period (min)			15			
raidiyələ i Gilou (IIIIII)			10			

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>†</b>	7	7	<b>^</b>	7	7	<b>†</b>	7	7	<b>^</b>	7
Traffic Volume (vph)	198	354	104	31	374	68	231	410	14	31	201	121
Future Volume (vph)	198	354	104	31	374	68	231	410	14	31	201	121
Lane Group Flow (vph)	215	385	113	34	407	74	251	446	15	34	218	132
Turn Type	pm+pt	NA	Perm									
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		8
Detector Phase	5	2	2	1	6	6	7	4	4	3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0	10.0	6.0	10.0	10.0	6.0	7.0	7.0	6.0	7.0	7.0
Minimum Split (s)	9.0	34.0	34.0	9.0	34.0	34.0	9.0	31.0	31.0	9.0	31.0	31.0
Total Split (s)	10.0	34.0	34.0	10.0	34.0	34.0	9.0	31.0	31.0	9.0	31.0	31.0
Total Split (%)	11.9%	40.5%	40.5%	11.9%	40.5%	40.5%	10.7%	36.9%	36.9%	10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag									
Lead-Lag Optimize?	Yes	Yes	Yes									
Recall Mode	None	Min	Min									
v/c Ratio	0.61	0.56	0.17	0.08	0.76	0.14	0.61	0.80	0.03	0.11	0.46	0.27
Control Delay	21.7	24.8	4.9	11.7	33.6	2.1	23.2	37.2	0.1	13.7	26.1	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	24.8	4.9	11.7	33.6	2.1	23.2	37.2	0.1	13.7	26.1	6.1
Queue Length 50th (m)	19.2	50.6	0.0	2.7	55.3	0.0	22.7	60.8	0.0	2.7	25.1	0.0
Queue Length 95th (m)	#35.1	79.7	9.7	7.2	85.7	3.6	42.9	#116.2	0.0	7.9	46.1	11.7
Internal Link Dist (m)		166.1			379.2			159.6			471.1	
Turn Bay Length (m)	25.0		5.0	25.0		35.0	20.0		5.0	55.0		65.0
Base Capacity (vph)	353	761	715	468	753	701	413	648	543	319	699	659
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.51	0.16	0.07	0.54	0.11	0.61	0.69	0.03	0.11	0.31	0.20

### Intersection Summary

Cycle Length: 84

Actuated Cycle Length: 71

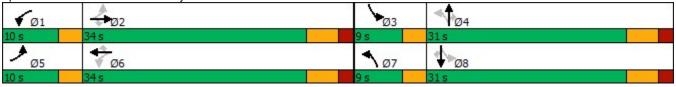
Natural Cycle: 85

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy & York Rd



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	*	<b>^</b>	7	*	<b>↑</b>	7	7	<b>↑</b>	7	*	<b>↑</b>	7
Traffic Volume (vph)	198	354	104	31	374	68	231	410	14	31	201	121
Future Volume (vph)	198	354	104	31	374	68	231	410	14	31	201	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
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
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	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	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1690	1847	1570	1755	1830	1537	1629	1762	1276	1738	1902	1567
FIt Permitted	0.28	1.00	1.00	0.46	1.00	1.00	0.50	1.00	1.00	0.31	1.00	1.00
Satd. Flow (perm)	496	1847	1570	853	1830	1537	854	1762	1276	563	1902	1567
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)	215	385	113	34	407	74	251	446	15	34	218	132
RTOR Reduction (vph)	0	0	73	0	0	51	0	0	10	0	0	97
Lane Group Flow (vph)	215	385	40	34	407	23	251	446	5	34	218	35
Confl. Peds. (#/hr)	1					1	1					1
Heavy Vehicles (%)	8%	4%	4%	4%	5%	4%	12%	9%	28%	5%	1%	2%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4		4	8		8
Actuated Green, G (s)	32.7	26.2	26.2	25.9	22.4	22.4	28.6	22.5	22.5	22.4	19.3	19.3
Effective Green, g (s)	32.7	26.2	26.2	25.9	22.4	22.4	28.6	22.5	22.5	22.4	19.3	19.3
Actuated g/C Ratio	0.45	0.36	0.36	0.35	0.31	0.31	0.39	0.31	0.31	0.31	0.26	0.26
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0	3.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	340	660	561	344	559	469	399	540	391	221	500	412
v/s Ratio Prot	c0.06	0.21		0.00	c0.22		c0.05	c0.25		0.01	0.11	
v/s Ratio Perm	0.22		0.03	0.03		0.01	0.19		0.00	0.04		0.02
v/c Ratio	0.63	0.58	0.07	0.10	0.73	0.05	0.63	0.83	0.01	0.15	0.44	0.08
Uniform Delay, d1	14.1	19.1	15.5	15.7	22.7	17.9	17.2	23.6	17.7	18.4	22.5	20.3
Progression 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
Incremental Delay, d2	3.8	1.3	0.1	0.1	4.7	0.0	3.1	10.0	0.0	0.3	0.6	0.1
Delay (s)	17.9	20.4	15.6	15.8	27.4	18.0	20.3	33.6	17.7	18.8	23.1	20.4
Level of Service	В	С	В	В	С	В	С	С	В	В	С	С
Approach Delay (s)		18.9			25.3			28.5			21.8	
Approach LOS		В			С			С			С	
Intersection Summary												
HCM 2000 Control Delay			23.8	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			73.3	S	um of lost	t time (s)			18.0			
Intersection Capacity Utilization			74.0%	ICU Level of Service D								
Analysis Period (min)			15									

c Critical Lane Group

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Lane Group	NBT	SBT	Ø3
Lane Configurations	<b>↑</b>	<u> </u>	.50
Traffic Volume (vph)	193	55	
Future Volume (vph)	193	55	
Lane Group Flow (vph)	210	60	
Turn Type	NA	NA	
Protected Phases	2	6	3
Permitted Phases			
Minimum Split (s)	542.0	542.0	58.0
Total Split (s)	542.0	542.0	58.0
Total Split (%)	90.3%	90.3%	10%
Yellow Time (s)	10.0	10.0	10.0
All-Red Time (s)	5.0	5.0	2.0
Lost Time Adjust (s)	0.0	0.0	
Total Lost Time (s)	15.0	15.0	
Lead/Lag			
Lead-Lag Optimize?			
v/c Ratio	0.12	0.04	
Control Delay	5.2	4.6	
Queue Delay	35.2	0.0	
Total Delay	40.4	4.6	
Queue Length 50th (m)	33.4	8.8	
Queue Length 95th (m)	38.9	12.1	
Internal Link Dist (m)	15.9	495.8	
Turn Bay Length (m)			
Base Capacity (vph)	1687	1687	
Starvation Cap Reductn	1478	0	
Spillback Cap Reductn	0	0	
Storage Cap Reductn	0	0	
Reduced v/c Ratio	1.00	0.04	
Intersection Summers			
Intersection Summary			
Cycle Length: 600	<b>1</b>		
Actuated Cycle Length: 600		NDT and	S.CDT O
Offset: 0 (0%), Referenced	to phase 2:	INDI and (	o.sbi, St
Natural Cycle: 600			
Control Type: Pretimed			
Splits and Phases: 5: Wa	atson Rd & F	Sailway ∩	rossina
opinio anu ritases. 3. Wa	aloun Nu ox I	Tallway C	ossiriy
Tø2 (R)			
542 s			
1			
▼ Ø6 (R)			
542 s			

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								<b>↑</b>			<b>↑</b>	
Traffic Volume (vph)	0	0	0	0	0	0	0	193	0	0	55	0
Future Volume (vph)	0	0	0	0	0	0	0	193	0	0	55	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)								15.0			15.0	
Lane Util. Factor								1.00			1.00	
Frt								1.00			1.00	
FIt Protected								1.00			1.00	
Satd. Flow (prot)								1921			1921	
FIt Permitted								1.00			1.00	
Satd. Flow (perm)								1921			1921	
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)	0	0	0	0	0	0	0	210	0	0	60	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	210	0	0	60	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type								NA			NA	
Protected Phases								2			6	
Permitted Phases												
Actuated Green, G (s)								527.0			527.0	
Effective Green, g (s)								527.0			527.0	
Actuated g/C Ratio								0.88			0.88	
Clearance Time (s)								15.0			15.0	
Lane Grp Cap (vph)								1687			1687	
v/s Ratio Prot								c0.11			0.03	
v/s Ratio Perm											0.00	
v/c Ratio								0.12			0.04	
Uniform Delay, d1								5.0			4.6	
Progression Factor								1.00			1.00	
Incremental Delay, d2								0.2			0.0	
Delay (s)								5.1			4.6	
Level of Service								Α			Α	
Approach Delay (s)		0.0			0.0			5.1			4.6	
Approach LOS		Α			А			Α			Α	
Intersection Summary												
HCM 2000 Control Delay		5.0	Н	CM 2000	Level of S	Service		Α				
HCM 2000 Volume to Capacity ratio			0.11									
Actuated Cycle Length (s)			600.0	Sı	um of lost	time (s)			27.0			
Intersection Capacity Utilization			451.7%			of Service			Н			
Analysis Period (min)			15									
0.111												

c Critical Lane Group